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TASK AND SKILL ANALYSIS OF AGENCIES
REGULATING EAST CANADA
OFFSHORE DRILLING

Submitted

to

ROYAL COMMISSION ON THE
"OCEAN RANGER" MARINE DISASTER

NATIONAL PETROLEUM AND MARINE CONSULTANTS LIMITED

JUNE, 1984

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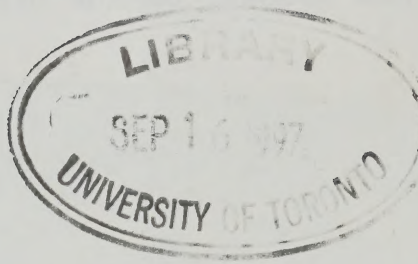
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June 15, 1984

Royal Commission on the
Ocean Ranger Marine Disaster
Fort William Building
St. John's, Newfoundland

Attention: Mr. R. Dyck, Studies Manager

Dear Sir:

We are pleased to submit herewith our final report entitled "Task and Skill Analysis of Agencies Regulating East Canada Offshore Drilling".

The report describes the skills required in the agencies regulating safety in Eastern Canada offshore drilling and presents the results of an assessment of skills existing in these agencies. The study team makes recommendations to the agencies on how they should address the areas of concern identified in the study. The information presented in the report is valid as of January, 1984. Therefore, any changes made in the regulatory system since that time are not reflected here.

National Petroleum and Marine Consultants were assisted in performing this assignment by the following sub-contractors: G.J. Purcell, of Marine Resource Consultants Limited; R. Schultz, of McGill University; G. Yungblut of E.P.I. Resources Limited; and S. Johnston, of Johnston Land and Sea Supervisors Limited.

We have enjoyed carrying out this study on your behalf and we hope that the Commission finds the information contained herein useful in fulfilling its mandate.

Yours very truly,

Wilson E. Russell

Wilson E. Russell
President

WER:pm

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EXECUTIVE SUMMARY

The primary objectives of the study were to carry out a task and skill analysis of agencies regulating the safety of Eastern Canada offshore drilling. The agencies included in the study are Canada Oil and Gas Lands Administration, Canadian Coast Guard, Newfoundland and Labrador Petroleum Directorate and Nova Scotia Department of Mines and Energy (Petroleum Resource Division).

The analysis addresses both managerial and technical skills in each agency. In the first instance, the required skills are identified, then the existing skills are examined in light of the requirements.

Management skills are addressed from the perspective of Senior Management Group, Middle Management, and Inspection Group. Technical skills are examined from the perspective of particular functional requirements.

The conclusions arising out of the study are mainly centered around the need, within agencies for more experience in and knowledge of the offshore industry which they regulate. The most important recommendations made by the study team are cited here.

That COGLA recognize the importance of offshore petroleum industry knowledge as a prerequisite for decision making at the Senior Management level, that they encourage senior management personnel to augment the existing quota of expertise with input from technically knowledgeable peers and subordinates, and that they encourage senior personnel to increase their own exposure in this area whenever possible, particularly with regard to new petroleum-related technologies.

That COGLA place greater emphasis on industry-related and technical expertise when choosing and training personnel for inspections positions.

That CCG encourage its Senior Management to recognize the difficulties inherent in the transfer of operations from a marine focus to a combined marine and petroleum - development focus, and that they continue to strive for a balance between the requirements of the two sectors by increasing their expertise in the new area and promoting co-operation among the various factions involved.

That NLPD recognize the importance of some form of petroleum industry experience or apprenticeship as a supplement to government or managerial expertise in decision-making at senior levels, and that they continue their efforts to provide this mix within their ranks.

INTRODUCTION

Regulation of the safety of exploration drilling in the offshore petroleum industry on the Canadian East Coast requires regulators with particular technical and management skills. The demands on these people from government, industry, and the public are extensive. They are working in an environment where every level has a high degree of responsibility, where decisions can directly affect the safety of specific groups of people, and where there are wide varieties of technology and a rapid rate of technological change.

Because of these inherent complexities and the strong forces at work in both government and industry to maximize the extent and pace of exploratory drilling, the professional judgement of regulators in this sector is brought to bear on some of the most significant and demanding problems facing Canadian administrators today. The ability of these regulators to cope with this responsibility, and to make clear, sensible, objective and fair decisions is thus a vital factor in the growth of the petroleum industry and, in turn, of our economic development.

There are a number of specific problems affecting the ability of regulatory agencies to cope with these complex demands. One of these problems is related to the progressive nature of the industry's evolution. Regulators in Canada are living in a world where there are very strong forces at work, both in government and in industry, to maximize exploratory drilling. Consequently, they find themselves under considerable pressure to accept equipment and procedures which do not fully comply with regulations. The professional judgement of regulators is brought to bear on more significant problems in the offshore petroleum industry in Canada today than possibly in any other industry in the country.

Regulators are constantly faced with new and innovative technology and new procedures arising out of industry's need to develop safer and more efficient drilling operations. The regulators are required to keep on top of these advances to ascertain the ramifications of changes and to make any necessary adjustments in their regulatory methodology.

A second problem is the breadth of expertise involved. Regulatory agencies need people who possess a wide variety of skills - the same type and breadth of skills that are in great demand in the offshore industry itself. There is, therefore, competition for their services, and generally, the personal financial incentives offered by the petroleum industry are more attractive than those offered by governments. Consequently, regulatory agencies find that it is sometimes difficult to fill those positions which require considerable practical as well as managerial experience and that there is a fairly high turnover rate even at senior administrative levels.

A third problem facing the personnel of regulatory agencies is the level of responsibility involved in this type of work. The consequences of skill deficiencies on the part of regulatory personnel could be substantial adversely affecting safety in a variety of ways. As a simplification, it may be said that these adverse effects arise out of regulators being too stringent or not stringent enough either in developing the regulations or in the enforcement of the regulations. For example, a lack of understanding of the lifesaving appliances on semi- submersible drilling rigs might lead to a regulation which causes the industry to

install new equipment that might not be fully evaluated. On the other hand, a lack of knowledge of the problems of rig helicopter operations might result in unclear regulations on rig heliports. With respect to enforcement, a lack of understanding on the part of an inspector of a drilling operation might result in the calling off of a drill at an inopportune time. Also, a lack of understanding on the part of an inspector of a new piece of equipment or a new procedure might result in a potential safety problem not being identified.

Despite these problems, regulatory personnel face and cope with an organizational structure that is often as complex as their operational environment.

The regulatory agencies responsible for offshore safety on the Canadian East Coast must fulfill mandates laid down by government regulation. The agencies are organized so that each element of their operations is in response to their mandates. The organizational structures reflect what the agencies are supposed to do and their methodology of doing it. The actual effectiveness of the organizations and their methodology is manifested in the ways and means individual people or groups of people perform their functions. The degree of performance is related directly to the skills possessed by these individuals or groups.

From a variety of perspectives, then, the focus centers on the same critical element - the skills (both managerial and technical) of the regulatory decision makers.

The subject of this report is an analysis of these skills - those required and those existing in regulatory agencies, both federal and provincial, which have primary responsibility for offshore safety on the Canadian East Coast.

Management skills are required in most areas of activity of a regulatory agency. These areas are policy and interaction with the political level; internal organization, management and administration; development of regulations; monitoring and enforcement of regulations; interaction with other agencies; interaction with industry; and interaction with the public. For the purposes of this report, the levels within a regulatory agency are broken down into three categories - Senior Management, Middle Management and the Inspection Group. As a generalization, the primary function of Senior Management is the overall management of the agency, the function of Middle Management is the management of particular branches of the agency, and the function of the Inspection Group is to perform specific tasks within a particular branch. In general, the degree of management skills required decreases from top level management down.

The technical skills required by such regulatory personnel may be broadly categorized along two lines. The first is according to function; the two principal functions of such organizations being (1) the formulation and development of regulations and (2) the monitoring and enforcement of these regulations. The second grouping is according to subject area, the two general categories being (1) drilling operations and (2) marine aspects.

The study is limited to primary agencies. The federal agencies addressed are the Canada Oil and Gas Lands Administration (COGLA) and the Canadian Coast Guard (CCG). These agencies are studied from both central and regional perspectives. The Provincial agencies addressed are the Newfoundland and Labrador Petroleum Directorate (NLPD) and the Nova Scotia Mines and Energy Petroleum Resource Division.

Secondary agencies are dealt with only in the context that skills are required in the primary agencies to ensure that areas under the responsibility of the secondary agencies are handled correctly.

This study was carried out by a team with extensive experience in both government regulatory agencies and industry. Because of the nature of the study, little hard information was available from the agencies themselves and, consequently, the study team quite often had to draw on the experiences and knowledge of its members. This dictated certain deviations from the original plan. For example, the assessment of existing technical and management skills in the regulatory agencies was carried out on a broader scale than originally envisaged. Nevertheless, it is felt that the aims of the study have been met and that the study has not suffered significantly from a more general approach.

CHAPTER 1

THE ORGANIZATION OF PRIMARY REGULATORY AGENCIES

1.1 CANADA OIL AND GAS LANDS ADMINISTRATION

The Canada Oil and Gas Lands Administration (COGLA) is responsible for the management of oil and gas exploration and development in the Canada lands. The principal purpose for the creation of COGLA was to concentrate, within a single body, the oil and gas management functions exercised by Department of Indian Affairs and Northern Development (DIAND), with respect to Canada lands situated north of the line of administrative convenience defined in Schedule IV of the Canada Oil and Gas Land Regulations and by Energy, Mines and Resources (EMR) with respect to Canada lands located south of that line.

The line of administrative convenience, as it affects the East Coast Study Area is indicated in Figure 1.1.

COGLA was formed in 1981, in preparation for the passage of the Canada Oil and Gas Act, proclaimed in March 1982 together with amendments to the Oil and Gas Production and Conservation Act. This legislation provided a restructured legal framework designed to govern oil and gas activity in the Canada lands according to the precepts of the National Energy Program (NEP).

STUDY AREA
Eastern Canada
Offshore

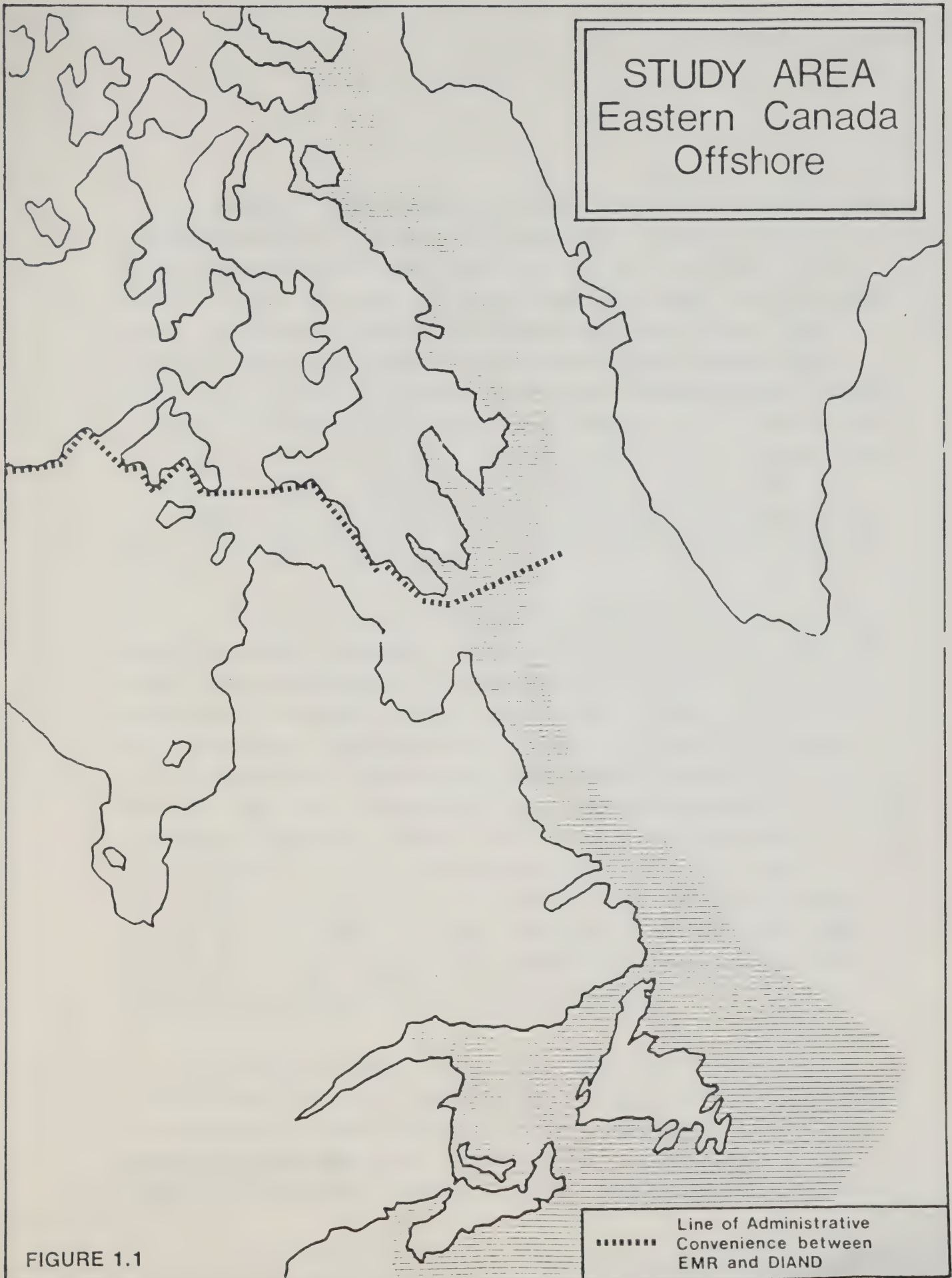


FIGURE 1.1

Several departments and agencies are involved in the implementation of the NEP's objectives. COGLA's mandate, in this respect, is to administer oil and gas activity in the Canada lands; to that end, COGLA has been made the principal point of contact between government and the oil and gas industry concerning their activities in the Canada lands. Under the direction of the Ministers of DIAND and EMR, COGLA negotiates exploration agreements, authorizes all activities respecting the exploration for and production of oil and gas on Canada lands, inspects exploration and production operations and coordinates the development of related Canada Benefits plans and the resolution of environmental concerns.

While a single new body combining components of two departments was created, the two Ministers involved retained their respective areas of responsibility north and south of the line of administrative convenience. COGLA, therefore, has an unusual organizational status; it is not a program or a branch within a particular departmental framework, nor does it have the independence of a Crown corporation. It cannot be compared to most existing federal units of organization. It is an administrative body with dual functional responsibility to Northern Policy (DIAND) and Energy Policy (EMR) and whose authority, derived from the Ministers of both parent departments, is exercised to the extent that ministerial delegation is made.

COGLA is headed by an Administrator, who has authority to take all ongoing operational decisions and bears the principal responsibility for the implementation of the Canada Oil and Gas Act. Policy advice is provided by the COGLA Policy Review Committee (PRC), which includes senior

personnel from both EMR and DIAND. The PRC ensures that COGLA policy decisions are consistent with the requirements of Energy Policy and Northern Policy.

As is apparent from the accompanying chart, Figure 1.2, COGLA is composed of six main branches, with two regional offices in the study area. The responsibilities of the six main branches are as follows:

a) Engineering and Control (Figure 1.3)

The Engineering Branch is responsible for the regulation and monitoring of exploratory drilling as well as development and production activities on Canada lands. The Branch is responsible for the administration and enforcement of the Oil and Gas Production and Conservation Act and of regulations promulgated thereunder as well as for ensuring that an operator takes all the precautions necessary for the safety of personnel, the prevention of pollution and the conservation of resources. The Branch also assesses the engineering feasibility of developing newly-discovered resources on Canada lands and determines allowable rates of production of completed wells.

It is clear that this branch is of prime importance for the purposes of this study and hence is the branch to which particular attention is concentrated in this analysis. However, for the sake of completeness, the other branches are briefly described.

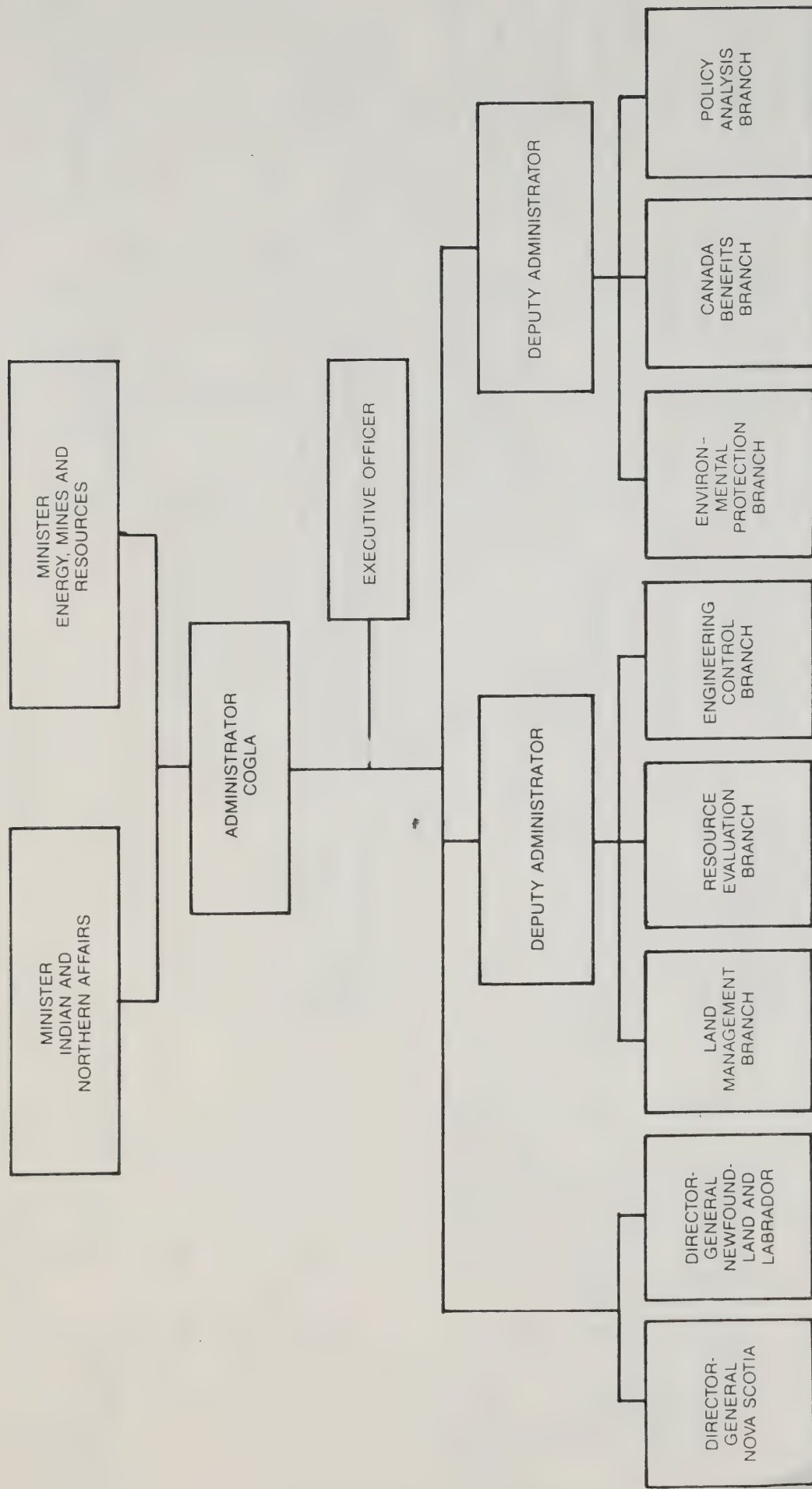


FIGURE 1.2

ORGANIZATIONAL CHART — CANADA OIL AND GAS LANDS ADMINISTRATION

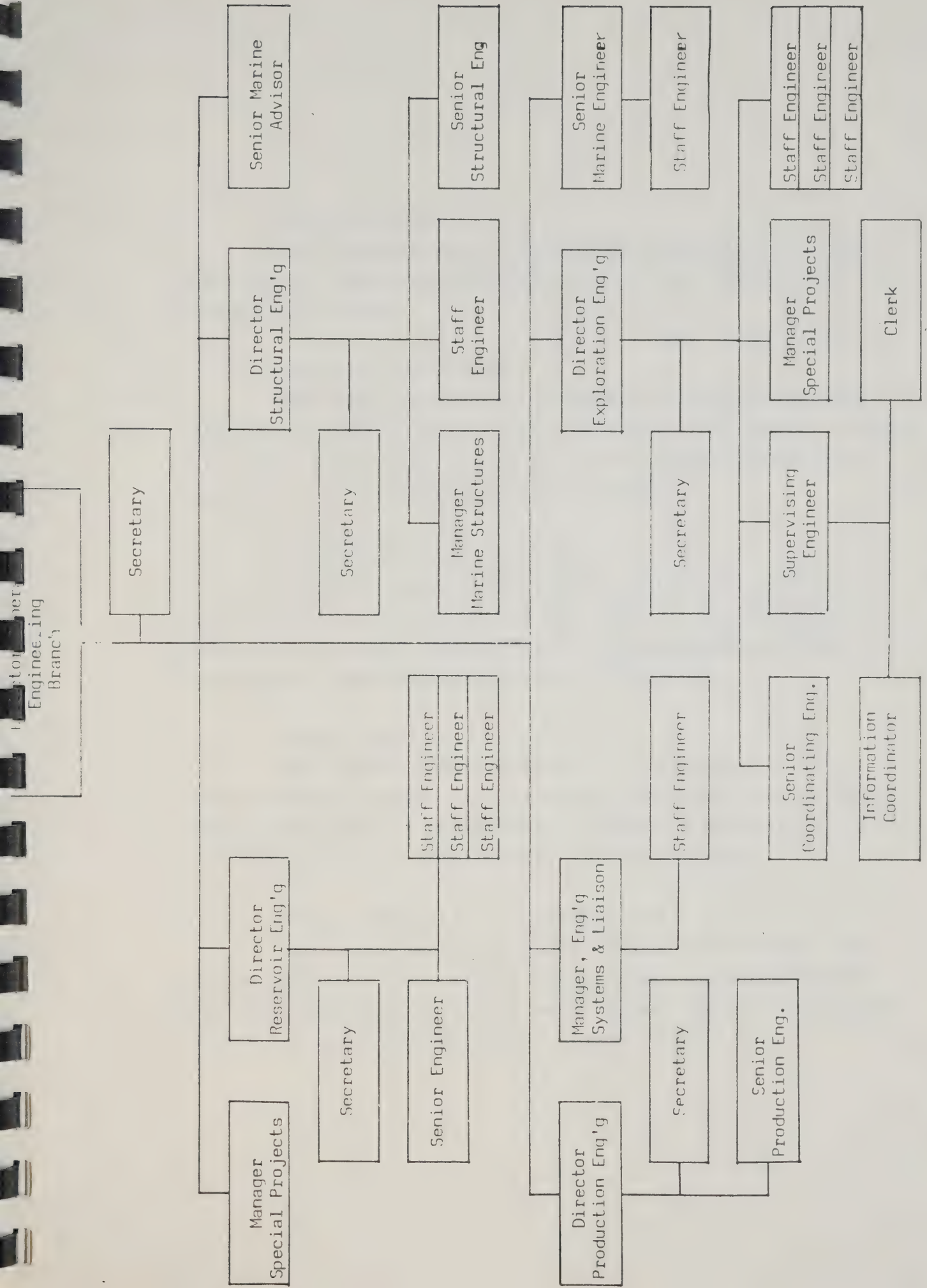


FIGURE: 1.3

b) Land Management

The Land Management Branch is responsible for the negotiation, issuance and administration of exploration and production rights.

c) Resource Evaluation

The Resource Evaluation Branch is responsible for identifying seabed, surface and subsurface geological hazards that might affect the safety of a drilling or production operation, or of a transportation system.

d) Environmental Protection

The Environmental Protection Branch has primary responsibility for evaluation and approval of contingency plans covering both environmental and personnel safety in the event of apprehended or actual disasters.

e) Canada Benefits

The Canada Benefits Branch is responsible for ensuring that Canada Benefits plans submitted by operators seeking exploration agreements or specific work or activity authorizations are satisfactory to the Minister.

f) Policy Analysis and Coordination

The Policy Analysis and Coordination Division is responsible for the analysis, development, interpretation and implementation of policy with respect to the management of oil and gas activity in the Canada lands.

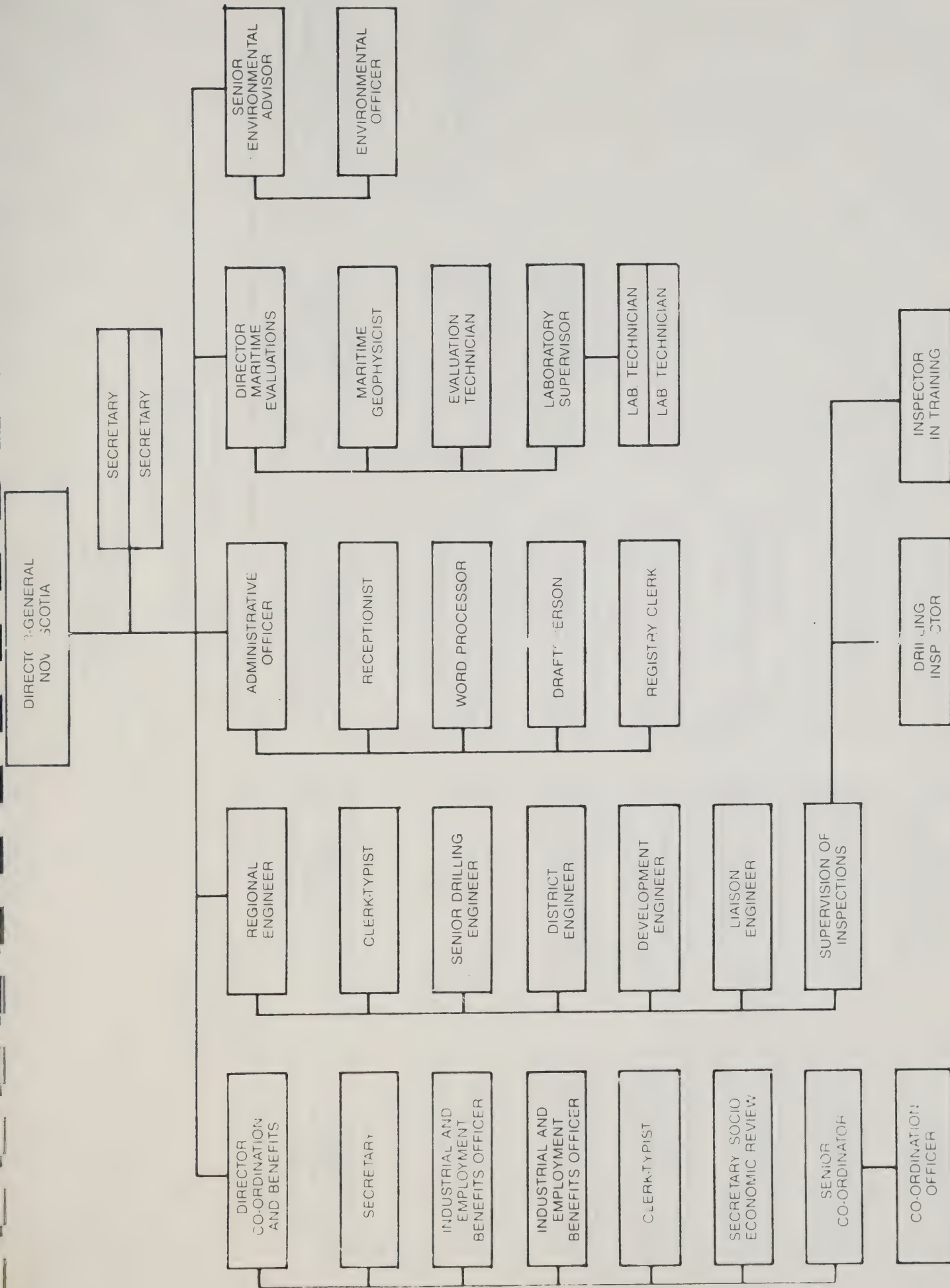
In addition to the six administrative branches described above, COGLA also maintains two regional offices in the Study Area, with responsibilities for the (1) Nova Scotia and (2) Newfoundland and Labrador Sectors. Each office is headed by a Director General. The organization of each regional office is given in figures 1.4 and 1.5. The Nova Scotia office has existed longer and is larger and more developed than the Newfoundland office.

Since COGLA is mandated to carry out all administrative responsibilities for regulation and management of the offshore petroleum resource under the terms of the Canada-Nova Scotia Offshore Agreement, the COGLA Nova Scotia office is responsible to the joint Canada-Nova Scotia Oil and Gas Board which administers this agreement, as well as to the COGLA Ottawa headquarters.

1.2 CANADIAN COAST GUARD (CCG)

A memorandum of understanding, setting out the terms and conditions for cooperation between the CCG and COGLA with respect to the provision of CCG marine services to the offshore areas of petroleum development, was signed on July 22, 1982.

The principal federal agency outside COGLA with direct responsibility for the safety of offshore petroleum



ORGANIZATIONAL CHART - COGLA, NOVA SCOTIA REGIONAL OFFICE

FIGURE 1.4

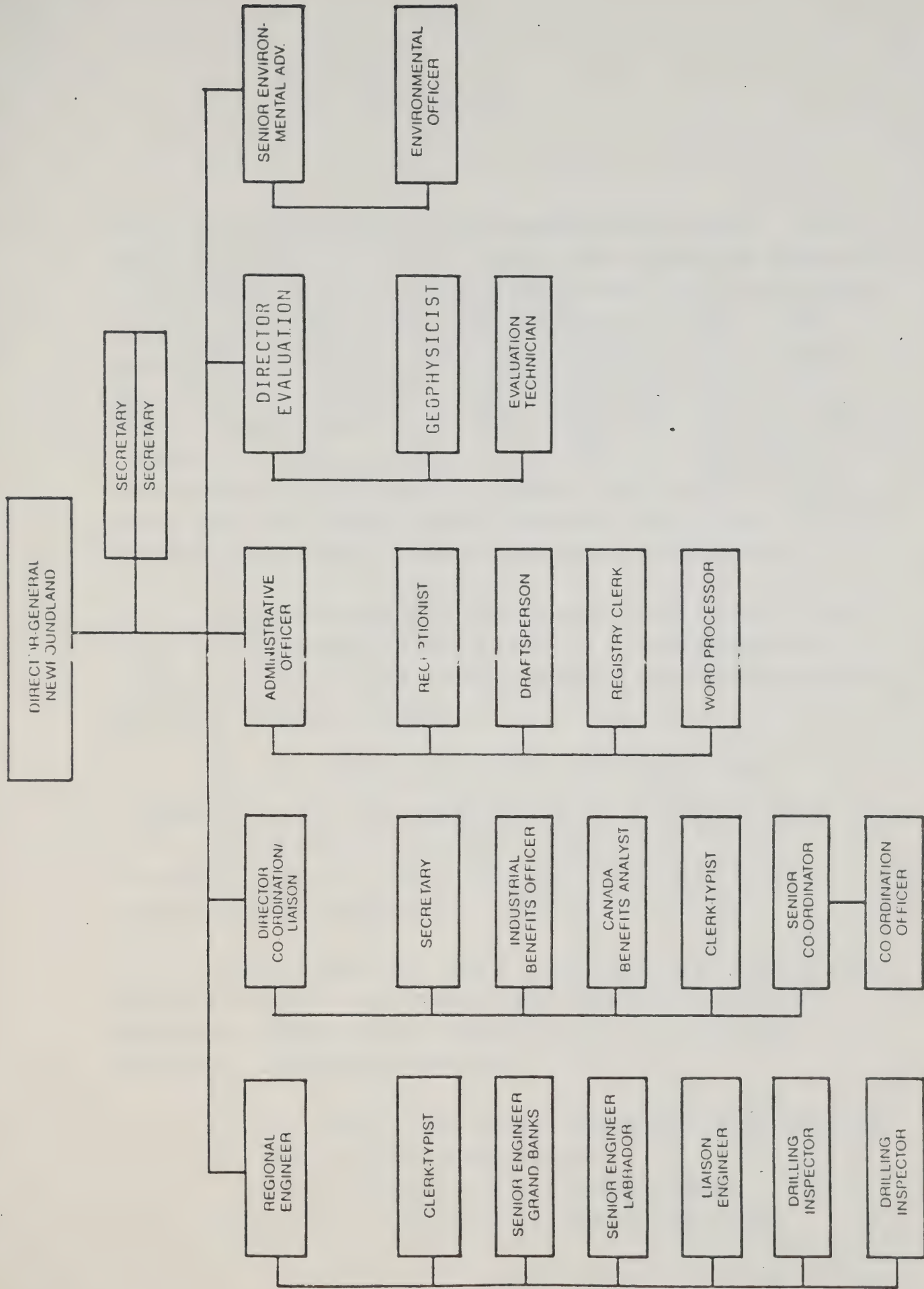


FIGURE 1.5

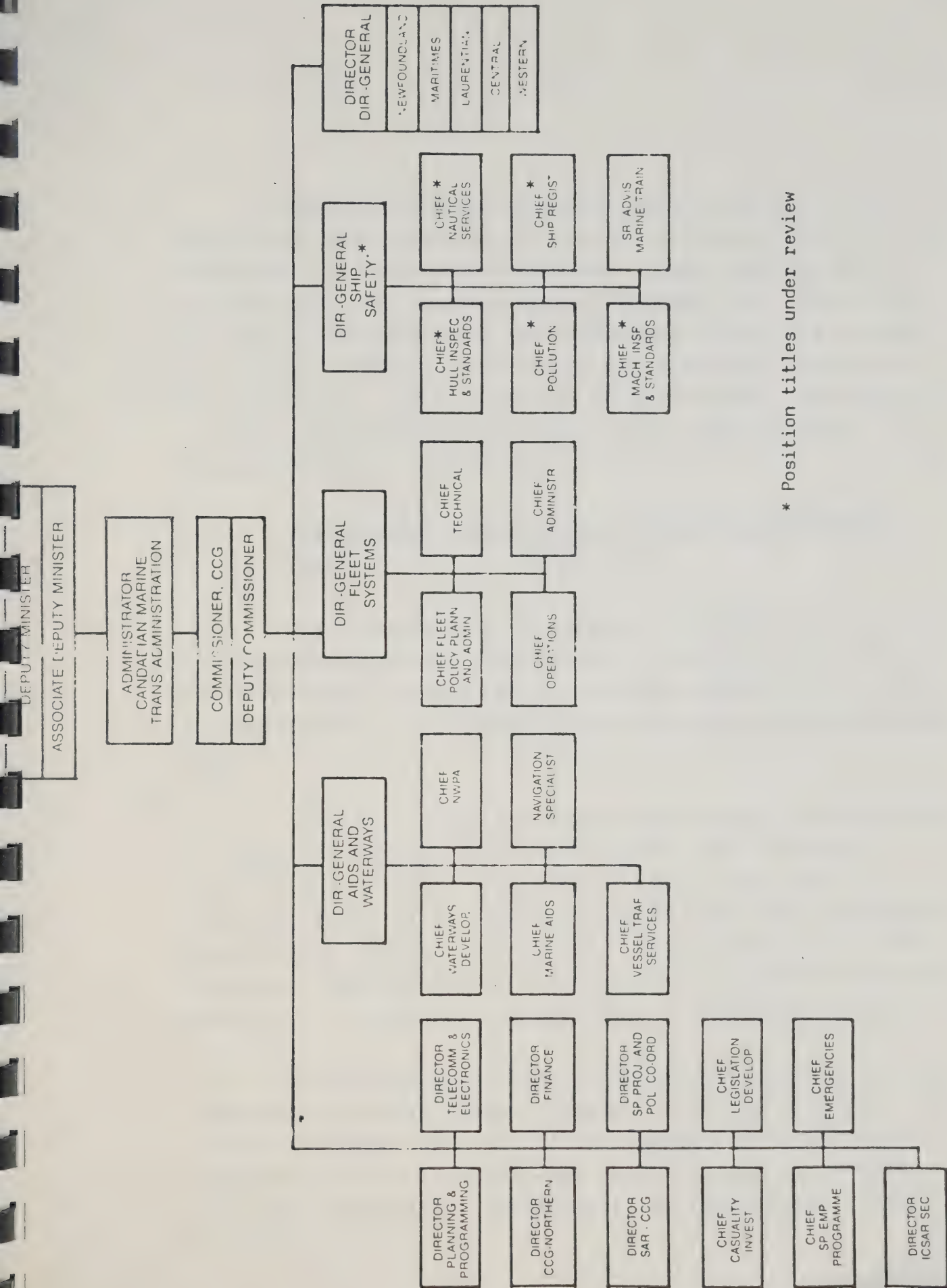
exploration operations is the Canadian Coast Guard. CCG's responsibilities lie in the control and approval of design and construction of marine aspects of drilling units and support vessels and their related safety systems, as well as the operations, equipping and marine staffing of such vessels. The authority to regulate these matters derives from the Canada Shipping Act, in the case of Canadian flag rigs and vessels and under the terms of the CCG/COGLA Memorandum Understanding in the case of foreign registered drilling units and their support craft operating under COGLA license, in the area seaward of the territorial sea of Canada.

The organization of the CCG is illustrated in Figure 1.6. As indicated, the CCG is run by a Commissioner who reports directly to the Administrator of the Canadian Marine Transport Administration.

Of the seventeen positions reporting to the Commissioner, the most important in the context of this study, is the Director General, Ship Safety. He is accountable for the formulation and implementation of legislation and regulations, and safety standards.

Four of the five "Chief" positions reporting to the Director General, Ship Safety have responsibilities for different aspects of the safety of offshore drilling activity. These positions are:

1. The Chief of the Design and Construction Division
2. The Chief, Ship Operations
3. The Chief, Training and Certification
4. The Chief, Planning and Special Projects



* Position titles under review

FIGURE 1.6 ORGANIZATIONAL CHART — TRANSPORT CANADA / CANADA COAST GUARD

CCG maintains two regional operations within the study area both headed by a Regional Director; these are the Maritimes and Newfoundland Regions. These regions do not coincide with the corresponding COGLA regions. Mirroring the Central organization, each regional office has a genus of regional managers responsible for different aspects of CCG operations. In the context of this study, the position of prime importance are the Regional Director and the Regional Manager, Ship Safety.

1.3 NEWFOUNDLAND AND LABRADOR PETROLEUM DIRECTORATE
 (NLPD)

The Newfoundland and Labrador Petroleum Directorate is responsible for the management of petroleum exploration and development in the waters off Newfoundland and Labrador as established by the Newfoundland Petroleum and Natural Gas Act.

NLPD was originally formed as part of the Department of Mines and Energy and was established as a formally separate and distinct organization in its own right in November, 1979, by an Order-in Council under the authority of the Minister of Mines and Energy. More recently, in 1981, a "Minister responsible for the Petroleum Directorate" has been appointed distinct from the Minister of Mines and Energy.

In general terms, the Petroleum Directorate is responsible for the overall management of the Province's oil and gas resources and for the development of legislation pertaining to the technical and policy issues surrounding petroleum exploration, development and production. Under the direction

of the responsible Minister, NLPD negotiates exploration agreements, authorizes all exploration and production activities and inspects operations associated with these activities. Although several departments and agencies within and outside the provincial government are involved in the provincial regulatory regime, the NLPD is the principal administrative body responsible. The NLPD is responsible for overall coordination of the activities of other provincial departments as they relate to offshore petroleum activity.

The overall structure of the NLPD is set out in the accompanying organization chart (Figure 1.7).

NLPD is headed by an Executive Director, who has authority for ongoing operational decisions as provided for under existing regulations. A policy and planning group within NLPD is responsible for social and economic assessment, public information and business co-ordination. Responsibility for safety-related issues lies within the Resource Management group, headed by an Assistant Deputy Minister.

Within the Resource Management section one group of personnel is responsible for the administration and enforcement of regulations covering the safety of offshore operations. The managerial and technical personnel responsible for operations safety form the "OPERATIONS CONTROL" group of the Petroleum Directorate, which, together with allied groups directly involved in regulation of operations safety is illustrated in Figure 1.8.

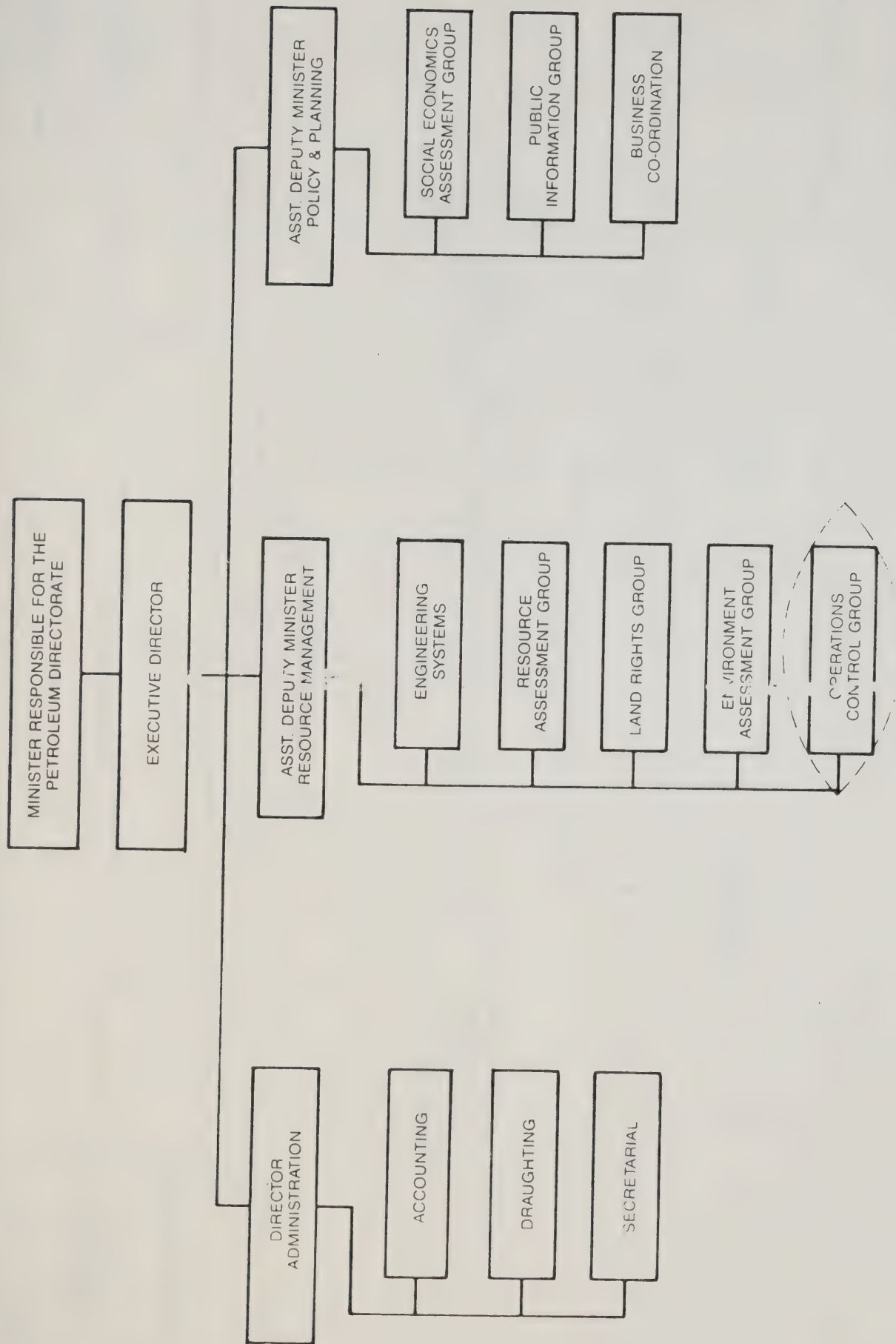


FIGURE 1.7

ORGANIZATIONAL CHART — PETROLEUM DIRECTORATE

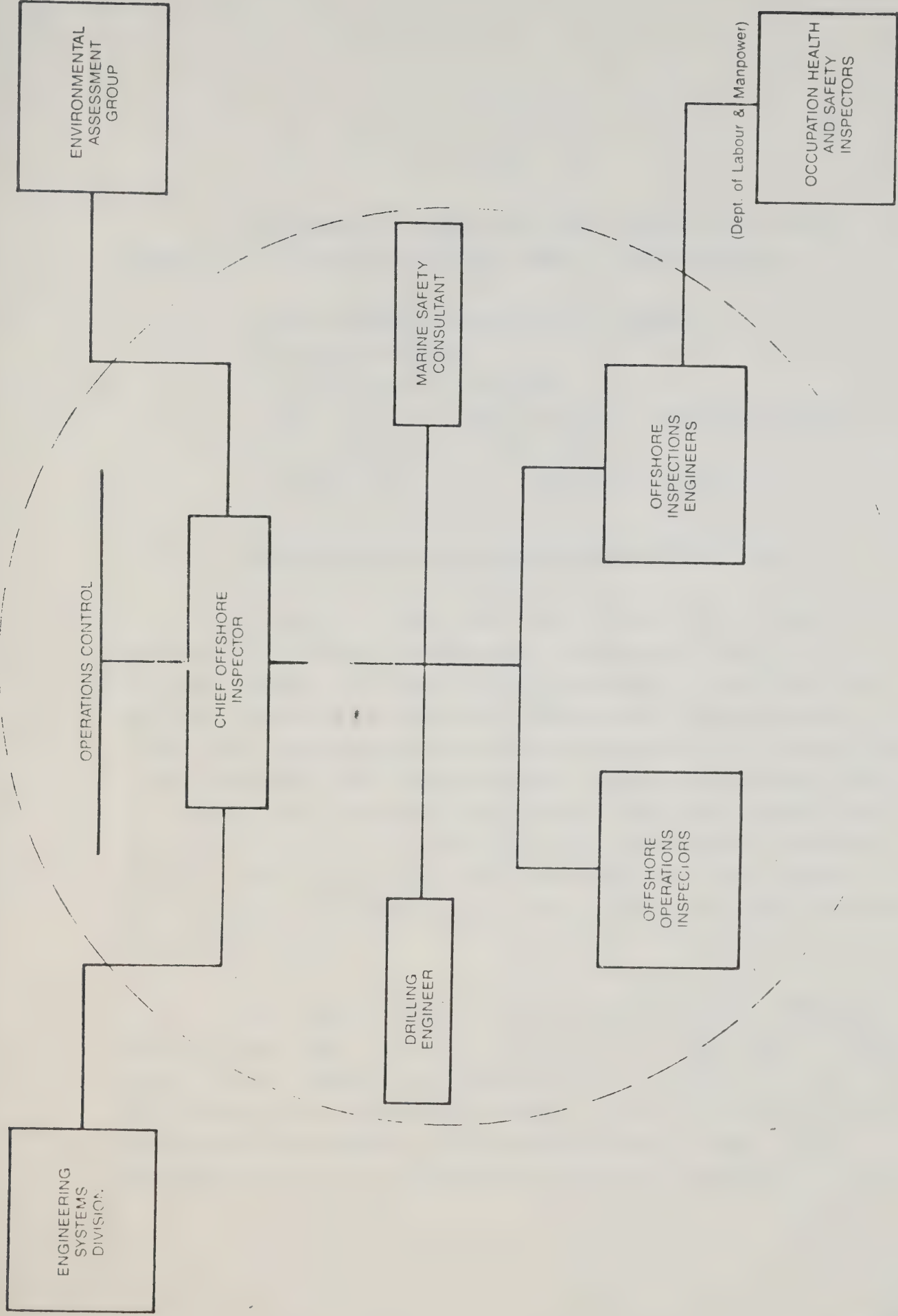


FIGURE 1.8

The principal positions within NLPD with direct responsibility for offshore safety are as follows:

- Chief Offshore Operations Inspector
- Drilling Engineer
- Marine Safety Consultant
- Ocean Engineer (Environmental Assessment Group)
- Senior Structural Engineer
- Occupational Health and Safety Inspector

1.4 DEPARTMENT OF MINES AND ENERGY, NOVA SCOTIA

On March 2, 1982, the Canada-Nova Scotia Agreement on Offshore Oil and Gas Management and Revenue Sharing was signed. Under the terms of this Agreement, the Canada Oil and Gas Lands Administration (COGLA)-Nova Scotia Office (CNSO) was established under the direction of the Canada-Nova Scotia Offshore Oil and Gas Board. COGLA was assigned with all of the administrative responsibilities with respect to oil and gas exploration activities in the Nova Scotia Offshore Region. The federal legislation, which sets the safety requirements for offshore exploration activity, was adopted for this region.

The organization of the Energy Section of the Nova Scotia Department of Mines and Energy is indicated in Figure 1.9. In the day-to-day administration by COGLA of activities in the Nova Scotia Offshore Region, which includes safety and training, Nova Scotia representatives participate in an advisory capacity in COGLA's dealings with industry. Staff

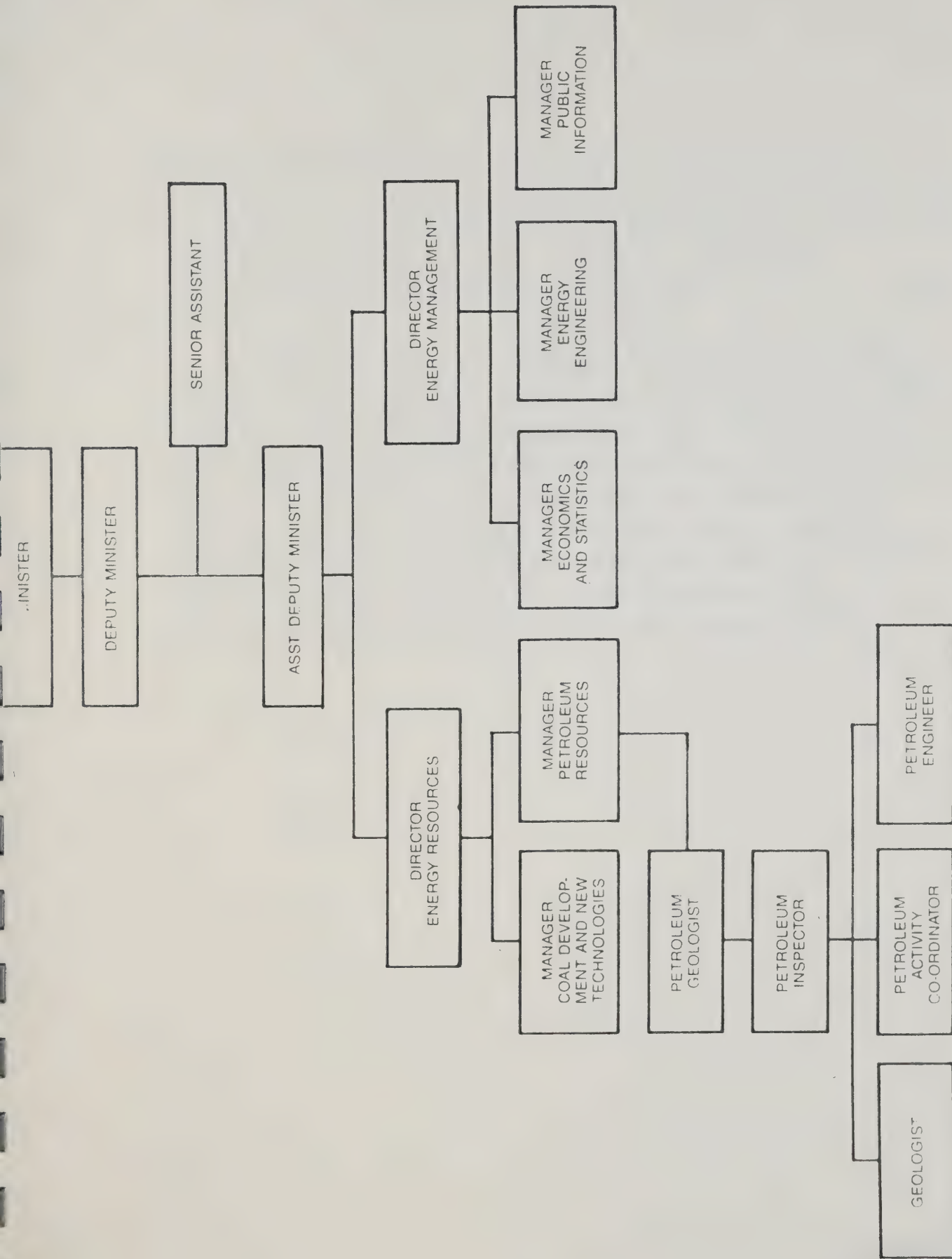


FIGURE 1.9

of the Petroleum Resources Section of this department interface and liaise with other provincial departments, COGLA and Industry on offshore technical and operating matters such as drilling, safety, diving, training, production, regulations and environmental protection.

The Nova Scotia government has set up an Offshore Co-ordinating Committee (O.C.C.) with representatives from Provincial Departments of Fisheries, Development, Environment, Finance, Labour and Manpower and Mines and Energy. The O.C.C. reports directly to the Provincial Cabinet on all offshore issues. In general, the Nova Scotia technical administration liaises directly with the COGLA Nova Scotia regional office. Resolution of any disputes is by representation to the joint Canada-Nova Scotia Board.

CHAPTER 2

MANAGEMENT SKILLS REQUIRED

Management skills are required, more or less, in most areas of activity of a regulatory agency. As mentioned in the introduction, some of these areas are policy and interaction with the political level; internal organization, management and administration; development of regulations; monitoring and enforcement of regulations; and interaction with other agencies, with industry, and with the public.

Each of these areas will be treated according to the three main category levels discussed in this report, that is 1) Senior Management 2) Middle Management and 3) Inspection Group.

2.1 SENIOR MANAGEMENT GROUP

2.1.1 Policy and Interaction with the Political Level

Senior Management personnel must be able to provide input into government policy related to safety matters in the offshore petroleum industry. They must be able to understand the role of the agency in both formulating and implementing policy. They must be able to develop procedures so that all relevant people in the agency are well informed of government policy on safety matters and of changes therein. In short, these people must be able to ensure that the mandate of the agency as set down by legislation is adhered to.

Senior Management must be able to deal effectively with the political arm of government, in representing the agency and in providing sound and professional advice to government.

Senior Management must also be able to act in a technical capacity by explaining to government the potential consequences of particular, political-level actions related to offshore safety. In this way they become an important source of sound and professional advice.

2.1.2 Internal Organizations, Management and Administration

Senior Management, being the lead group in the Regulatory Agency, should have the ability to organize and manage a very diverse operation. They should be able to distinguish between and prioritize safety issues and non-safety issues.

They must be able to ensure that lines of responsibility for safety throughout the agency are clear and are well understood by all relevant staff.

They must be able to set organizational objectives, to develop general guidelines and provide guidance for the working group to follow, and to clarify roles and responsibilities.

They must be able to ensure through internal assessments of activities and other internal mechanisms that the agency staff carry out their duties and responsibilities in a professional manner.

They must be able to assess the impact of new requirements on current task distributions and to realign responsibilities accordingly.

They must be able to deal with staffing and budgets. They must understand the requirements in the agency for particular expertise and they must be able to arrive at ways and means of obtaining that expertise. They must be able to assess what resources, including personnel, are available to fulfill the mandate of the agency and to take measures to fill any gaps.

2.1.3 Development of Regulations

Senior Management must be able to judiciously promote the development of regulations, guidelines and directives. They must have a good understanding of the potential consequences of implementing them.

They must have the ability to understand technological advances. They must be able to understand the broad relevance and consequences of technological change. Associated with this is the ability of the Senior Management to foster government research and studies into existing safety problems or potential safety problems.

They must be able to assimilate advice and recommendations from other levels in the agency with respect to development of regulations, guidelines and directives.

2.1.4 Monitoring and Enforcement of Regulations

Senior Management must be fully aware of their regulatory authority, its extent and its limitations.

They must be able to ensure that all relevant personnel are fully cognizant as well.

They must ensure that mechanisms are in place for the effective monitoring and enforcement of regulations.

2.1.5 Interaction with Other Agencies

Senior Management must be able to establish clear and well-understood lines of communication with other government agencies which play roles in offshore safety.

They must be able to develop co-operative and effective relationships with these agencies.

2.1.6 Interaction with Industry

Senior Management must be able to deal effectively with petroleum companies and their contractors in terms of global safety issues.

They must be able to understand the legitimate concerns of industry and to incorporate these concerns judiciously into the Senior Management decision-making process.

They must be capable of understanding those new technologies and procedures developed by industry that influence global safety issues.

They must be able to establish mechanisms whereby industry has input into the development of regulations, guidelines and directives, training requirements, etc.

2.1.7 Interaction with the Public

Senior Management must be able to present to the public, when necessary, explanations of the agency's activities pertaining to global safety issues.

2.2 MIDDLE MANAGEMENT

2.2.1 Policy and Interaction with the Political Level

Middle Management must be able to provide advice to Senior Management on policy matters when requested.

Middle Management must be able to provide advice to Senior Management on matters relating to the latter's dealings with the political level.

2.2.2 Internal Organization, Management and Administration

Middle Management must be able to provide suitable information and advice to the Management Group so objectives can be set for their divisions.

They must be able to supervise their divisions and ensure that personnel meet specific objectives.

They must be able to assign work, set work priorities, and assess work quality.

They must be able to allocate resources in their divisions including manpower and finances.

They must be able to assess training needs.

They must be able to complete performance appraisals on all supervised staff and make recommendations.

They must be able to motivate subordinates and resolve conflicts.

They must be capable of managing in a situation involving an offshore alert, contingency, or emergency.

2.3.3 Development of Regulations

Middle Management must be able to provide advice to Senior Management with respect to the development of regulations, guidelines and directives.

They must be able to directly manage the development of regulations, guidelines and directives.

They must be able to ensure that professional personnel are familiar with advances in theory and practice in their specialities and in technology and development in the offshore petroleum industry.

They must be able to keep Senior Management well informed of new technology and the consequences of its implementation in the offshore.

2.2.4 Monitoring and Enforcement of Regulations

Middle Management must be able to ensure that the relevant personnel are capable of performing the functions of monitoring and enforcing regulations.

They must be able to provide information and advice to Senior Management on problems in the monitoring and enforcement of regulations.

They must be able to make day-to-day decisions on interpretation of regulations and on significant safety issues.

They must be able to understand the consequences of their decisions.

They must ensure consistency in the inspection of drilling units.

They must be able to deal effectively with industry on specific safety issues of a difficult nature.

2.2.5 Interaction with Other Agencies

Middle Management must be able to maintain clear and well-understood lines of communication with other government agencies which play roles in offshore safety.

They must be able to work co-operatively and effectively with these agencies.

2.2.6 Interaction with Industry

Middle Management must be able to deal effectively with petroleum companies and their contractors in terms of significant safety issues.

They must be capable of understanding new technology and procedures developed by industry that influence all safety issues.

They must be able to manage mechanisms whereby industry has input into the development of regulations, guidelines and directives, training requirements, etc.

2.2.7 Interaction with the Public

Middle Management must be able to respond to public requests for information on the agency's activities pertaining to safety issues.

2.3 INSPECTION GROUP

2.3.1 Policy and Interaction with the Political Level

The Inspection Group must be able when requested to provide information and advice to Middle Management in any matters related to their speciality.

2.3.2 Internal Organization, Management and Administration

The Inspections Group must be able to provide supervision of less senior inspectors and technicians.

2.3.3 Development of Regulations

The Inspection Group must be able to provide Middle Management with practical information and advice related to specific safety issues that are addressed in new regulations, guidelines and directives.

2.3.4 Monitoring and Enforcement of Regulations

The Inspection Group must be capable of performing the functions of hands-on monitoring and enforcement of regulations.

They must be able to provide information and advice to Middle Management on problems in the monitoring and enforcement of specific regulations.

They must be able to understand the authority and limitations of regulations.

They must be able to understand the level of decisions that can be made without consulting others and the level of decisions that must be submitted to others for approval.

They must be able to understand the consequences of their decisions.

They must be able to evaluate and identify potential weaknesses in new procedures and equipment and make appropriate recommendations regarding their acceptability.

2.3.5 Interaction with Other Agencies

The Inspection Group must be able to interact with other government agencies at the working level.

They must be able to co-operate with personnel from other agencies during inspections and in the exchange of information.

2.3.6 Interaction with Industry

The Inspection Group must be able to deal effectively with petroleum companies and their contractors in terms of specific safety issues covered by their inspections.

They must be capable of receiving the respect of industry personnel.

They must be able to communicate with industry personnel in the workplace concerning lack of compliance with regulations.

2.3.7 Interaction with the Public

The Inspection Group must be able, when requested, to provide information and advice to Middle Management concerning the Agency's dealings with the Public.

CHAPTER 3

TECHNICAL SKILLS REQUIRED

3.0 INTRODUCTION

In this chapter it is proposed to set out in some detail the technical expertise which, in an idealized situation, the regulatory agencies responsible for the safety of offshore petroleum exploration activity would have available in order to effectively carry out their mandate. Skills necessary for organizational or managerial functions were dealt with in Chapter 2.

The technical skills required by such regulatory personnel may be broadly categorized along two lines. The first is according to function; the two principal functions of such organizations being (1) the formulation and development of regulations and (2) the monitoring and enforcement of these regulations. The second is according to subject area. The subject areas may be grouped into two general areas - drilling operations and marine aspects.

The following discussion is an attempt to address the issue along both these lines. The approach used in Chapter 2, i.e. grouping according to senior management, middle management and inspectors levels, was not considered appropriate here. In general, there is no need of a high level of technical expertise among senior management, although it is desirable that senior management personnel should include among their number some individuals with direct experience of the petroleum industry. The real need for technical skills is at the middle management and inspectors level. However, here it was felt that technical skills required by these personnel could be best be addressed by functional and subject areas of responsibility.

Thus Section 3.1 discusses the general skills required by representative technical positions within various levels of the regulatory agencies. Here the functional division between those responsible for formulation and development of regulations (primarily a middle management responsibility) and those responsible for carrying out and supervising inspections is emphasized.

The remaining discussion in Sections 3.2 and 3.3 is divided according to subject area, recognizing that some items do not fall neatly into any one of the above categories. For example, pressure vessels and lifting appliances are dealt with under marine aspects. Within each subject area, some attempt has been made to sub-divide skills required along functional lines. Such functional division is, to some extent, dependent on position in the organizational hierarchy and thus was also dealt with in Chapter 2.

The need for technical knowledge and experience in the development of regulations is self-evident. In general, those responsible for formulation of particular regulations should have an in-depth knowledge of, and experience with, those specialized subject areas covered by the proposed regulations.

In the case of monitoring and enforcement, technical knowledge of the subject area being regulated is necessary in order to:

- (i) understand existing legislation and practically apply it;

- (ii) judge the success of designers, instructors, operators etc., in complying with legislation;
- (iii) advise those regulated on means of compliance; and
- (iv) to investigate any accidents or other non-compliance with legislation.

For these purposes, an inspector's knowledge and experience need not be as extensive or as specialized as would be required by someone responsible for drafting regulations.

3.1 REPRESENTATIVE TECHNICAL POSITIONS

As described above, the technical skills required by regulatory personnel will depend on their function and position within the organization hierarchy. Although position titles will vary from agency to agency, the following section sets out the general technical skills required for certain key technical positions within each management level of a regulatory agency. Detailed requirements for specific technical subject areas are discussed in later sections.

3.1.1 Senior Management

Regional Managers:

The myriad organizational skills necessary to the management of a regional operation are discussed in Chapter 2. In addition to these the Regional Manager must have the technical skills to adequately respond to industry, public, and agency requests for information, assistance or guidance

on any matter affecting area office operations which would include the areas of drilling and servicing.

As discussed above, a senior level manager such as the regional manager need not have a high level of technical expertise. However, he must have a sufficiently broad and up-to-date knowledge of technical issues in order to delegate authority and responsibility in an appropriate proportion, and be able to innovate, plan for future considerations, develop new ideas, encourage initiative, and implement new programs and/or approaches in order to promote a climate that would motivate staff.

3.1.2 Middle Management

Senior Drilling/Marine Inspectors:

In the following discussion the term inspector is used throughout but is intended to cover the job function of drilling inspectors or marine surveyors as appropriate from the context. A senior inspector must be able to:

- identify and evaluate any new type of equipment or vessel, and make appropriate recommendations regarding the acceptability of such equipment;

- evaluate any unsatisfactory rig condition reported by an inspector and be able to provide assistance to that inspector in order that an appropriate course of action may be undertaken;

- interpret any special condition on a well permit, and be able to formulate, or assist an inspector in formulating an appropriate program to ensure that the condition(s) are met;

- evaluate critical and/or sensitive proposed drilling locations, and recommend suitable measures to the operator to provide on-the-job training to area inspectors in the area of drilling rig inspections;

- provide reasonable assistance to the appropriate Supervisor in developing drilling/marine inspection objectives, and coordinating, recording, and controlling the drilling rig inspections activity;

- compile and record in a suitable manner, the necessary statistics regarding drilling/marine operations for the annual and other reports;

- evaluate, any proposed changes to regulations and make recommendations to his immediate and/or senior supervisor regarding the validity and applicability of the proposed changes;

- collect evidence regarding contraventions to regulations in a manner that would be acceptable in a court of law.

Technical Specialists:

Technical specialists must be able to provide technical advice on specific aspects of drilling or marine operations. This technical advice must be current and at a level that is comparable to that expected from similar positions in industry. They must be able to provide and interpret all of the relevant technical aspects of the specialties to the Management level, and be able to represent the agency at meetings, and hearings, and/or serve on technical committees as the technical representatives.

Senior technical specialists, particularly in the area of development of regulations, must be able to provide

to the agency technical advice on an advanced level which may not be readily available, and may require a considerable amount of project and research work. These specialists must have sufficient in-depth knowledge of their area to organize and conduct, with or without subordinate assistance, project assignments involving review of current legislation in the area and recommendations for new legislation.

Technical Managers:

In addition to general supervisory skills, a Technical Manager must have a high level of technical knowledge, especially of his area of specialty. Technical Managers must have a detailed understanding of the technical subject areas for which they are responsible and they must be able to:

- organize and assess the inspection activity in the area of his specialties;
- identify substandard quality work on the part of senior inspectors, and be able to recommend appropriate action to remedy the problem;
- provide feedback to regional operations regarding quality of inspection;
- assist in assessing the training process;
- develop in-house training programs in his area of specialty;
- deliver some of the training programs that are developed and to evaluate other programs that are presented at this level;
- act as an advisor in any matter related to his specialty.

3.1.3 Inspector Level

Drilling Inspector:

Inspectors should have complete familiarity with the equipment and procedures used in offshore drilling, particularly as they apply to the drilling units in use within their geographical area. They must be able to actively participate in training sessions, and undertake special measures such as pre-deployment inspection of units to upgrade and to familiarize themselves with new units, equipment and techniques whenever necessary.

In general, inspectors should have the ability to review daily reports from operators, to identify operations in progress and to monitor well progress. They should have complete familiarity with regulatory requirements and be able to conduct a rig inspection according to procedures set out by their superiors. They must have a sufficient understanding of drilling operations to enable them to choose an appropriate course of action when an unsatisfactory condition is found.

Marine Surveyor:

The term "surveyor" is more commonly applied to those responsible for inspection of marine requirements than "inspector". Marine Surveyors must be able to plan and conduct inspection programmes covering marine safety, including inspection of machinery and electrical systems, survey of support vessels and cargo, survey of offshore drill rigs and drillships, investigation of marine accidents and examination of marine and engineering officers. They must be able to interpret and apply regulatory requirements covering marine aspects of drilling operations.

3.2 DRILLING AND WELL CONTROL

In general all personnel involved in the regulation of drilling operations and procedures should have sufficient training and experience to identify the purpose, functions, limitations, and physical and operating characteristics of all equipment and materials used in exploratory drilling operations. In addition, all inspection personnel should have a detailed understanding of the procedures involved in well control and testing, and familiarity with procedures such as logging and fishing. In particular they should be aware of hazards and areas of special risk involved in such procedures, together with measures which may be taken to ameliorate such hazards. The equipment and procedures involved in these operations are described in more detail below. As pointed out above, the degree of knowledge required will depend on function, with inspectors requiring less knowledge than those formulating regulations.

3.2.1 Drilling Equipment and Materials

Virtually all equipment and materials used in a drilling operation have a direct or indirect effect on the safety of the operation, although blow-out prevention equipment and mud systems are of particular importance for well control.

The principal types of equipment and materials with which personnel should be familiar are listed below.

The degree of familiarity with a particular manufacturer's equipment required by regulatory personnel

will of course depend on job function. For example, knowledge of particular equipment will be required of personnel at the inspector level in order to determine whether the particular equipment is in compliance with regulatory requirements. A broader knowledge of many types of equipment would be required of personnel involved in the formulation of regulations.

Knowledge of materials used is also essential to formulation and enforcement of regulations. For example, inspectors should have knowledge of the common grades of casing in order to check design calculations for collapse, tension and bursting of casing string.

1. Annular Blowout Preventers, including particular manufacturer's equipment e.g. Hydril, Shaffer, Cameron, etc.

2. Ram Type Blowout Preventers, including the particular manufacturer's equipment listed above and general Ram Locking Devices.

3. Choke Manifolds and Auxiliary Equipment including flexible hoses (identification), chokes and valves (manual, hydraulic, remote control, pressure ratings), gauges, line sizes, bends, configuration, inside BOP's, and stabbing valves.

4. Accumulator Systems, including manufacturer's specifications, pressure ratings, capacities and calculations therein, and control systems.

5. Sub Sea/BOP Stack Configuration, including well heads, and guide bases.

6. Mud Systems, including common types, weights and viscosities, mud tanks and pumps (circulation system), hazards (gas cut), alarms, pit level indicators, flow indicators, and purposes of desanders, desilters, and shale shakers.

7. Deviation Survey Instrument, including single and double shot and MWD.

8. Conductor Pipe and Surface Casing, including weight and grade, and thread and collar size.

9. Casing and liners, including weight and grade, thread and collar type and size, and mixed strings.

10. Auxiliary Casing Equipment, including float shoes, float collars, thread locking compounds, centralizers, scratchers, and inner strings (for cementing large diameter casing).

11. Cements, including classes (neat, construction, pozzolanic), retarders, accelerators, and specific uses (abandonment plugs, casing).

3.2.2 Drilling Procedures

As a matter of basic knowledge, all those involved in regulation of drilling operations should be familiar with geological formations and should be able to identify different formations that are known to contain oil or gas.

Personnel with direct responsibility for monitoring of regulations covering drilling procedures should hold valid certificates issued under industry approved training courses in blowout prevention and kick control procedures. Inspectors should have intimate knowledge of well control procedures and know the steps involved in carrying out an

acceptable blowout prevention drill. In particular, they should be knowledgeable of well-control problems associated with over-pressure zones which are common in many Canada Lands areas.

Particular procedures with which inspection personnel should be knowledgeable include the following:

- They should have familiarity with coring procedures including conventional and sidewall.

- They should have detailed knowledge of procedures involved in drill stem testing including the down hole and surface equipment used.

- They should have in-depth knowledge of the hazards of lost circulation, and be aware of the materials needed to require circulation.

- They should be familiar with logging operations including types of logs, purposes of various logs, and physical tools needed for each.

- They should be familiar with fishing operations and know the most frequent causes of stuck pipe, the types of tools used and the hazards of unrecovered fish.

Inspection personnel should also be able to identify the cementing requirements for both casing and abandonment of wells for different geographical areas and be able to issue or approve abandonment programs that protect potential hydrocarbon bearing zones and aquifers from adverse effects of interzonal communication.

3.3 MARINE ASPECTS

In general, the work involved in the regulation of marine aspects of offshore exploratory drilling requires an extensive knowledge of one of the marine specialties, either engineering, naval architecture, nautical or electrical; a good working knowledge of the other specialties; and a detailed knowledge of government legislation pertaining to marine safety, international regulations and conventions, and departmental policies governing the planning, co-ordinating and administration of inspection, enforcement and examination of programmes. Supervisory positions require skill in planning and co-ordinating inspection programmes, and developing and providing technical advice and information to government and industry. This knowledge and skill is normally acquired through completion of extensive training and apprenticeship programmes in one of the marine specialties and/or comprehensive work experience in the marine field, with some exposure to the offshore petroleum industry a desirable asset.

The skills requirements for regulation of specific subject areas affecting the safety of marine operations, structures and equipment are described in more detail below.

3.3.1 Marine Structures

Regulatory personnel responsible for the formulation of requirements and standards for the design, construction and maintenance of marine structures used in petroleum exploration should have sufficient training and experience in

naval architecture, structural, or mechanical engineering or allied disciplines to qualify them to prescribe construction materials, procedures and techniques to be followed to ensure:

- 1) The integrity of the primary structure itself, i.e. its resistance to partial or total collapse under catastrophic external forces or from structural fatigue.

- 2) The integrity of major pieces of machinery or equipment and in particular the prevention of disintegration of large rotating machinery.

- 3) The integrity of pressurized systems.

Allied to the first area of concern are the inherent structural fire protection included in the design of the structure and the safety and suitability of the electrical systems for drilling operations in a marine environment.

Those responsible for inspection of marine structures for compliance with Government regulations should have sufficient technical training to recognize the intent of regulations covering these items, and to competently perform examinations and tests necessary to determine compliance.

The skills required for monitoring and inspection of these major items are discussed below together with the specialized areas of electrical systems and structural fire protection.

A. PRIMARY STRUCTURAL INTEGRITY

The phases involved in the regulation of the primary structure may be divided as follows:

- 1) Design appraisal and construction inspection of drilling units.
- 2) Inspection of installation procedures and on going operations of the units.
- 3) Monitoring and inspection of the maintenance and repair of the unit and its equipment.

With respect to the first phase, the primary objective of those formulating regulations is to ensure that the unit is designed and constructed to withstand the environmental forces to which it may be subjected at the site(s) of its intended use. The skills required by personnel responsible for development of regulations to achieve this objective cover a very broad area and hence a multi-disciplinary team of individuals would generally be required. Such a team would be comprised of engineers with graduate training and experience in structural, mechanical, materials and ocean engineering or naval architecture as well as physical scientists with training in meteorology, oceanography and ice physics. Particular skills required by individuals in such a team include knowledge of:

- statistical techniques for estimation of long return period parameters;

- numerical modelling of structures and their interaction with environmental forces;

- design techniques to facilitate inspection and maintenance.

Besides formulating regulations, senior inspectors and technical specialists would be required to inspect the construction of new units to ensure adherence to required design parameters. Particular skills required here include knowledge of quality control techniques and methods of checking to eliminate faults in materials and construction.

It should be noted that many of the skills described above which are required for design appraisal exceed those of regulatory personnel and would be carried out by specialist consultants such as classification society representatives.

Of the items covered in the second phase, the subjects of transit operations and procedures for mooring/positioning of the unit are discussed in 2.2.2 below. On-going marine operations of the unit are generally covered during regular safety inspections. The skills necessary to inspect installation operations are a knowledge of both structural engineering and marine operations and in particular an understanding of how such operations may affect the structural integrity of a drilling unit. With respect to on-going operations, those personnel responsible for formulating regulations require a detailed knowledge of the items which should be covered in a unit's Operator's Manual and inspectors must be able to understand and familiarize themselves with the requirements of the Operator's Manual for each unit within their jurisdiction in order to ensure that on-going operations follow the procedures set out therein.

The third phase, maintenance and repair of damage to the unit, is also the subject of regular inspection by regulatory agencies as well as independent inspection under

requirements for maintenance of "class" of the units. The skills required of inspectors are knowledge of marine maintenance procedures and repair techniques including the ability to evaluate welding procedures and equipment, to perform non-destructive testing of repairs and to assess how critical local damages are to the integrity of the entire structure.

B. MACHINERY AND EQUIPMENT

Personnel responsible for formulation of regulations governing machinery and equipment should have detailed knowledge of the operation, construction, modification, overhaul and maintenance of machinery and major equipment on board drilling units. In particular, inspectors must be able to assess compliance with regulatory requirements for the outfitting and maintenance of lifesaving, fire-fighting, navigation and cargo-handling equipment, especially cranes. Finally, inspection personnel must be able to assess the qualifications and competency of personnel responsible for the operation and maintenance of all these types of equipment.

The breadth of the subject areas included above dictates that a number of inspectors or technical specialists may be required to cover all aspects. Marine Surveyors are often specialized into such categories as hull, machinery, operations and nautical, reflecting their training and experience.

C. PRESSURIZED SYSTEMS AND ELEVATING DEVICES

Regulatory personnel responsible for formulation of regulations must have the inspection of boilers, pressure

vessels, high-pressure piping systems, and elevating devices. Inspection of these items is traditionally carried out by occupational safety inspectors in land-based industrial sites. Inspectors monitoring these items should have similar training and experience as such land-based inspectors but, should be knowledgeable of special factors associated with the location of this equipment in a marine environment, such as the effects of motion of the drilling unit and the inherent limitations on testing of such equipment in a marine setting.

D. STRUCTURAL FIRE PROTECTION

Inspectors of structural fire protection must have knowledge of the proper placement and construction of accommodation facilities to afford occupants maximum protection from fire. They must be familiar with techniques for incorporation of fire protection into decks, passageways, ladders and the like and for the isolation of such areas by fire doors and fire-resistant bulkheads. They must be aware of the need for fire protected escape routes and designated "control areas".

In addition to all the above, those responsible for formulation of regulations must be able to prescribe materials which afford structural fire protection to ensure their fire-resistance is suitable to the severity of hydrocarbon fires.

E) ELECTRICAL SYSTEMS

In general, responsible regulatory personnel should be sufficiently knowledgeable to ensure that electrical systems are suitable for their purpose and use in the marine

environment. In particular, they must be aware of methods for protection of systems in areas rendered hazardous by the possible presence of flammable gases or vapours. They must be able to identify and assess the adequacy of ventilation of such areas and to evaluate the effectiveness of measures taken to protect electrical systems from the effects of ingress of seawater.

Since a large proportion of electrical-related accidents occur during maintenance operations, inspectors should also be able to assess the qualifications of personnel responsible for maintenance of electrical systems.

3.3.2 Marine Operations

A. DRILLING UNITS

The following operational considerations affect the safety of offshore drilling units, and therefore must be subject to regulation and inspection by qualified regulatory personnel.

(i) Mooring/Positioning Systems

In general, regulatory inspectors must be familiar with the design and operation of dynamic positioning or mooring systems. In particular, they must be able to judge the appropriateness of a given positioning system for the water depths and prevailing environmental conditions, and to evaluate the effectiveness of quick-release systems in areas where ice or icebergs constitute a hazard to drilling units.

(ii) Ballast Control

Those responsible for development of regulations in that area must have in-depth knowledge of design and operation of ballast control systems. Inspectors must know the steps involved in performing tests and emergency drills of these systems.

(iii) Transit Operations

Responsible regulatory personnel must be aware of the special hazards of transit operations, especially the movement and repositioning of jack-up rigs. Inspectors must be able to ensure that such operations are conducted in compliance with procedures outlined in the operations manual.

(iv) Safety Zones

Regulatory personnel must know the procedures to be followed in the establishment and enforcement of safety zones around drilling units. Inspectors should know proper means of marking the presence and extent of such zones.

B) Support Vessels

Marine surveyors should be knowledgeable and experienced in the design considerations, construction and suitability of vessels used in support of offshore drilling, in particular vessels used in the rescue or evacuation of personnel. Inspectors must be able to evaluate the adequacy of safety equipment and facilities available on board such vessels.

3.3.3 Safety/Lifesaving Procedures and Equipment

Regulatory agencies should include, among their

personnel, individuals with knowledge and experience in the following areas:

(i) On-site Safety Management

The organization and functioning of safety committees on board drilling units must be understood by Inspectors. Liaison between inspectors and such committees in the course of inspections should be promoted by regulatory agencies.

(ii) Safety Training

Consistent safety training for all inspectors to industry standards should be required, including such general training as BOST. In addition, certain regulatory personnel should be capable of evaluating specialized training for lifeboat crews, those responsible for lifesaving equipment, crane operators and safety representatives.

(iii) Lifesaving Equipment

Inspectors must be thoroughly versed in regulatory requirements for lifesaving equipment, procedures and supplies. They should know how to conduct and evaluate lifesaving drills including man-over-board and abandonment drills.

(iv) Emergencies/Contingencies

Inspectors should know procedures to be followed in the case of emergencies as set down in emergency/contingency manuals and supervisory personnel should have the capability of evaluating the emergency/contingency plans set down in such manuals and ensuring their co-ordination with government emergency measures planning.

(v) Firefighting Equipment/Procedures

Inspectors should be aware of regulatory requirements for firefighting equipment and procedures, including being able to conduct and evaluate firefighting drills during inspections. Those responsible for developing regulations must know techniques for protecting structures from fire on the sea both by structural design and fire-fighting procedures should also be considered.

3.3.4 Environmental Assessment

The positions described below fall outside the gamut of general regulatory inspection but are necessary to support everyday inspection activity and to fulfill the agency's mandate of overseeing the safety of drilling operations.

(i) Meteorology

Responsible personnel must have a sufficiently in-depth knowledge of operational meteorology to be able to prescribe and evaluate procedures for meteorological observations (including aviation weather), to evaluate the adequacy of site-specific forecasting in support of offshore drilling operations especially helicopter landings, and to prescribe data collection requirements for determination of design criteria.

(ii) Oceanography

Responsible regulatory personnel must be able to prescribe observation programmes for the collection of wave, current and other oceanographic data in support of operations (real time) and for statistical and design data base purposes.

(iii) Ice and Icebergs

Responsible regulatory personnel must be able to prescribe procedures for monitoring ice/iceberg movement and severity for both real-time operational support and as a data source for research and statistical purposes.

(iv) Site Investigation

Responsible regulatory personnel must be able to prescribe and evaluate procedures for investigation of seabed and subsea conditions for proper positioning and securing of drilling units, especially jack-up rigs, and in support of well spudding operations.

(v) Design Criteria

Responsible regulatory personnel must be able to devise methods of collecting or generating a data base of all relevant physical environmental data for a given area and to determine realistic design criteria for drilling structures used in the offshore.

CHAPTER 4

ANALYSIS OF SKILLS PRESENT

4.0 INTRODUCTION

This section will examine the federal agencies, (COGLA and the CCG), and the provincial agencies, the (NLPD and the Nova Scotia Department of Mines and Energy, Petroleum Resources Division) on the basis of the total complement of skills present versus the skills identified as required in the previous chapter. In addition, the question of how well the resources within each organization cover all the areas of concern with respect to the safety of offshore exploratory drilling operations will be addressed.

Much of the information on existing skills came from meetings between the study team and the agencies and from printed documents given to the study team by the agencies. Only those positions which have relevance to safety have been analysed here. In general, the study team has attempted to augment the information made available to them, by personal interviews with selected personnel or their superiors.

A thorough analysis of the resource base of skilled managerial and technical personnel existing in the regulatory agencies covered by this study has been hampered by a shortage of detailed information on the technical qualifications desirable and/or existing in certain positions. For example, one agency, while providing reasonably complete information on qualifications desired for most positions, was unwilling to provide resumes of personnel occupying those positions. A second agency, on the other hand, provided detailed training/experience data on key personnel but did not provide detailed positional qualification documents.

The analysis which follows first addresses the breadth of coverage of required subject areas set out in Chapters 2 and 3 above. This is done by describing the relevant positions within each agency as to their areas of managerial and technical expertise. Secondly, the actual skills present in these positions are analysed to determine the depth of coverage of these requirements. The two are presented together for each management level so that a total picture of the adequacy of skills present within each agency is achieved.

The emphasis of our analysis is on the breadth and detail of coverage of required areas of technical and managerial expertise within the agencies, as outlined in Chapters 2 and 3. Less emphasis has been placed on quantifying the depth of coverage in terms of training and experience, both because of lack of detailed data and because it is felt that flexibility in experience/training requirements is permissible, as long as basic requirements are met.

4.1 THE CANADA OIL AND GAS LANDS ADMINISTRATION (COGLA)

4.1.1 Senior Management

Senior Management in Ottawa is composed of an Administrator, two Deputy Administrators and six Directors-General. In addition, each of the two regional operations within the study area (Newfoundland and Nova Scotia) is headed by a Director-General. A description of the organization and branch responsibilities of the COGLA operations is given in Chapter 1. Descriptions of the most

relevant senior management positions are given below with respect to their technical and management functions.

POSITIONS AND RESPONSIBILITIES

The Administrator of COGLA has the authority to make all ongoing operational decisions and bears the principal responsibility for the implementation of legislation. He reports to the Deputy Minister of Energy, Mines and Resources (EMR) and to the Deputy Minister of Department of Indian Affairs and Northern Development (DIAND) and receives direction from them on how he relates COGLA operations to relevant EMR and DIAND activities. The Administrator is provided policy advice by the COGLA Policy Review Committee which includes senior personnel from both EMR and DIAND and ensures that COGLA policy decisions are consistent with the requirements of Energy Policy and Northern Policy.

The Director-General for Engineering and Control is responsible for developing and applying engineering regulatory controls on oil and gas activities on Canada Lands. He is the technical advisor to the Administrator on all engineering matters and represents the Administrator in these respects. He is involved in the encouragement of the best drilling practices to ensure that Canada remains in the forefront of technological developments. He is involved in the approval of all drilling schemes for which both expert assessment by in-house professionals and third party independent appraisal is necessary. He manages a branch of 72 officials and support staff which includes the functional supervision of three regional operations. He manages an

operating budget and is responsible for administering energy Research and Development grants of approximately nine million dollars per year.

The overall goal of this position is to ensure that oil and gas activities on Canada Lands are carried out so as to be as accident proof as state-of-the-art engineering technology can foresee. To achieve this the incumbent must be able:

- to provide overall federal leadership in the engineering aspects of oil and gas activities;
- to ensure that provincial agencies and other federal departments are consulted to avoid conflicts detrimental to exploration or development activities.
- to establish regulations, standards and guidelines governing engineering requirements for oil and gas activities.
- to negotiate technical changes with oil companies such as the application of new technology;
- to approve amendments to engineering plans;
- to select, train and manage staff;

The Director-General Environmental Protection plans and manages COGLA policies, programs and processes for environmental protection to ensure that control measures are in place to permit the aggressive exploration, development and production of oil and gas in Canada Lands. He assists in the design of, and approves, major and minor emergency plans to be triggered in case of accidents that threaten the physical, biological or social environment, including contingency plans for human safety.

The Directors-General, Regional Operations are responsible for the administration of regional offices of COGLA and to oversee the regulation of drilling safety in the offshore area under their jurisdiction. In particular, the regional Director-General is responsible for interpretation of COGLA's safety requirements to regional operators, for liaison with representatives of industry and provincial governments on safety issues, and for overseeing the monitoring and inspection of offshore operations for compliance with COGLA safety regulations. The regional Director-General is also responsible for granting the "Authority to Drill a Well".

The incumbents of all these senior positions must be able to contribute directly to government policy respecting the exploration, development and production of oil and gas on Canada Lands.

DISCUSSION OF SKILLS

Senior management responsible for safety within both central and regional operations of COGLA, have extensive experience in managerial and administrative roles within government, so there can be little doubt that sufficient organizational and management skills exist here. Such skills are most vital at this level so that Senior Managers can balance operational safety considerations against the federal government's policy of aggressive exploration to achieve the goal of energy self-sufficiency. The experience of Senior Management in administering public policy should enable them to resolve these often conflicting priorities. As well, they have the experience to deal with the political level of government, providing advice on safety policy issues.

An apparent deficiency identified by the study team is the lack of offshore petroleum industry experience in the Senior Management group, both in Ottawa and in the regional offices. Indeed, there also appears to be a lack of experience in dealing with the petroleum industry from within government. (An exception to this is the Director-General, Nova Scotia, who does have considerable experience in dealing with the industry in a government role). Although it is arguable that such personnel should not be "steeped" in industry attitudes, the consequences of the lack of technical experience within the industry could be significant. However, personnel occupying Senior Management positions in COGLA obviously have the ability to make up for "lost time" and acquire substantial knowledge of the offshore. Utilizing management techniques, these individuals can draw on advice from their more technically knowledgeable peers and subordinates and can recognize their own limitations when making decisions. Thus the lack of direct industry experience may not interfere with their effectiveness as managers.

A particular difficulty that faces Senior Managers with little direct offshore industry experience is keeping on top of new technology; i.e. new equipment and procedures. The nature of the Eastern Canada exploratory drilling dictates the use of different modes of drilling, i.e. jack-ups, semi-submersibles and drillships. Within each mode, there are a wide variety of platforms, as well as equipment and operational procedures. Despite their lack of "hands on" experience, the Senior Management of COGLA appears to have a good appreciation of the "new technology" situation and they foster research where applicable into safety related

matters. They utilize the results of both research and practical experience in the development of regulations, guidelines and directives.

The Senior Management appears to be quite cognizant of their regulatory authority. They have put in place mechanisms managed by Middle Management for the effective monitoring and enforcement of regulations. The monitoring process for exploratory drilling is actually taken to the Senior Management level through the submission of inspection reports and the like.

COGLA appears to have established clear and well-understood lines of communication with other government agencies especially the CCG. However, they appear to have problems in developing a high degree of co-operation in some areas. This is a consequence to a great extent of the system brought about by the arrangement between COGLA and the CCG for foreign flag drilling units. The personnel of each agency appear to foster an element of rivalry with the other agency which may be perceived as a skill deficiency.

In general, the Senior Management deals effectively with the petroleum industry and they incorporate industry's concerns in their decision making processes. The informal mechanisms for discussion of global issues with industry appear to work smoothly. There is still some need to establish a consistent system for industry input in such areas as development of regulations, guidelines and directives, and training requirements. Also, interaction with the public is well handled when explanation of the agency's activities are necessary.

4.1.2 Middle Management

The Middle Management level has primary responsibility for technical aspects of the regulation and enforcement of the safety of offshore activity, including the formulation of detailed regulations in particular areas of expertise and supervision of inspection activity. Descriptions of the most relevant positions in Middle Management within COGLA are given below.

POSITIONS AND RESPONSIBILITIES

The Director, Structures is responsible for establishing standards and regulations covering offshore structures, for assessing and approving the design and installation of facilities submitted by oil companies and for enforcing relevant regulations. He develops engineering regulations, standards and guidelines pertaining to structures. His duties include ensuring that oil companies are subject to and maintaining appropriate certification for all exploration structures.

The incumbent is responsible for maintaining continuous consultation with industry technical groups in respect to the setting and enforcement of exploration standards with respect to structures and for advice and recommendations to other federal agencies on oil and gas technical matters. He is the chairman of a technical committee to implement the Memorandum of Understanding between COGLA and CCG and for all offshore inspection classification procedures. He is also responsible for recommendations to carry out basic research on structures.

The Director, Exploration is responsible for establishing and maintaining equipment standards and operational procedures that will ensure that exploratory drilling is conducted with a minimum of risk to human life. He is responsible for developing and applying drilling engineering regulatory controls on oil and gas activities on Canada Lands and for drilling process inspection.

The incumbent is involved in the approval of all drilling schemes. He is responsible for inspections by conservation engineers who have the power to halt operations and order remedial action. Among the supervisory positions for which he is responsible are the Senior Drilling Engineer, the Diving Systems Engineer and the Senior Safety Engineer. He is also the main technical advisor on many significant research contracts.

The Chief, Emergency Response is the most important principal position within the Environmental Protection Branch with responsibility for offshore safety. He is responsible for drafting and implementing guidelines for petroleum company emergency response plans, coordinating and managing the review process of individual company plans when submitted in application for a Drilling Program Approval; preparing and maintaining an overall COGLA marine emergency response plan, and managing a wide range of research and development projects relating to state-of-the art countermeasures or technologies.

The Chief Physical Environmentalist is responsible for recommendations to Senior Management on the acceptability of offshore exploration activity in terms of the physical

environment. He is responsible for providing advice and opinions to senior officials on the impact of the physical environment on offshore activities including safety of operations (e.g. storms and sea states for drillship stability assessments); the determination of annual operating weather windows (e.g. the commencement and cessation dates for exploratory drilling off Labrador); the occurrence of extreme meteorological, oceanographic and ice events for the time and location of activities (e.g. operational down-time due to weather); as well as providing technical direction and advice to COGLA's staff in regional offices.

The Regional Engineer manages the engineering and inspection activities of the regional office. He is responsible for the regulatory control and enforcement of human safety and drilling requirements for offshore activities. He develops engineering specifications, regulations and criteria for all aspects of offshore exploration.

The Regional Engineer provides policy advice to senior officials of COGLA, other departments and agencies, and private industry regarding drilling methods, facilities and equipment. He establishes and promotes a technical and information consultative service in the region for industry, government and the public. He implements and co-ordinates ocean engineering activities relevant to exploratory drilling. He supervises a professional staff of engineers, inspectors and support staff.

DISCUSSION OF SKILLS

In contrast to Senior Management, those in the Middle

Management positions described above generally have considerable petroleum industry experience, both within industry and within government. This is particularly true of the Engineering Branch and the Regional offices. The personnel within the Environment Protection Branch generally have less petroleum industry experience.

With respect to the areas of technical expertise dealt with in Chapter 2, the study team found that the technical and management resources at this level, in terms of both training and experience, were very high. This was particularly true in the areas of drilling and structures and less so in marine operations. With respect to academic qualifications, all personnel at this level possessed at least undergraduate degrees, and many had post graduate degrees in their area of expertise.

The coverage of marine aspects is, of course, augmented by use of the expertise of the Canadian Coast Guard which is available to COGLA under the terms of the COGLA - CCG Memorandum of Understanding. The implications of this are dealt with in more detail in Section 4.2 below. Here we note that it appears that regulation of marine exploratory structures (MODU's) will be assumed by CCG, whereas regulation of production structures will be retained by COGLA. The overlapping subject matter in areas such as this, emphasizes the need for smooth working relations between the two agencies. Such a relationship seems most highly developed at this middle management level, but there is still need for improvement.

Within the Environmental Protection Branch, the potential conflict of priorities between environmental safety and personnel safety, inherent in combining responsibility for both items in one position (i.e. the Chief, Emergency Response) is a source of concern, although the incumbent appears highly knowledgeable in both aspects. Close co-ordination and co-operation between the Environmental Protection Branch, the Engineering Branch (Structures), the Canadian Coast Guard and other concerned departments such as Atmospheric Environment (AES) and Department of Fisheries and Oceans (DFO) is particularly important in the areas of design criteria for drilling units and on regulation and limits on operations because of environmental conditions.

4.1.3 Inspection Group

The role of site specific and regional monitoring and inspection of operations is perhaps the most important function of the regional offices. In this regard, they exercise discretion on most issues on a regional level, with provision for appeal to Ottawa headquarters if needed.

POSITIONS AND RESPONSIBILITIES

The positions at this level with responsibility for safety are the following:

Inspectors are responsible for conducting periodic inspections of drilling units for compliance with the Canada Oil and Gas Production and Conservation Act and Regulations thereunder, and, in particular, the Canada Drilling Regulations. Although principally concerned with drilling

equipment and procedures, these regulations also cover such items as safety, lifesaving and firefighting equipment and procedures. Inspectors also examine and comment on applications for Approval of Drilling Programmes, and for Authority to Drill a Well.

Conservation Engineers also carry out on-site inspections, and oversee the work of inspectors. In addition they plan and conduct engineering studies on exploration activity and are responsible for recommendations and assistance to superiors in development of regulations. Conservation engineers have the statutory authority and responsibilities of this designation as specified in various regulations promulgated under the Canada Oil and Gas Production and Conservation Act and other pertinent legislation.

DISCUSSION OF SKILLS

The general educational qualifications of inspections staff appear adequate. All conservation engineers and most inspectors possessed undergraduate degrees in relevant disciplines. The amount of specialized petroleum industry training and experience varied widely. At the regional level, the majority of offshore petroleum industry training and experience among inspections staff had been gained as government regulators.

While COGLA prefers to employ industry-trained and experienced personnel as inspectors, these are not always available due to supply and economic reasons. When "green" inspectors are employed, as in the case of new engineering

graduates, these "inspectors-in-training" were put through a one year course of study in basic petroleum drilling technology covering most of the drilling procedures outlined in Chapter 3 above, together with an introduction to petroleum economics and geology. This study was interspersed with on the job experience in the central and regional offices.

Certain basic training such as BOP Certification and basic offshore survival training is required of all inspectors. While BOST is required before inspectors are sent offshore, inspectors are only sent to industry approved BOP schools after approximately one year of field experience. More specialized training is limited to certain personnel who are used as resource persons in the central operation. Examples of such specialized training include drill-stem testing, oil-based mud systems, overpressure training and, in the marine area, ballast-control of MODU's.

The discussions which the study team has had with industry representatives has led to the conclusion that general shortage of industry experience among inspections personnel can pose significant problems. It was often remarked that inexperienced inspectors tend to focus on detail while missing "larger issues". A lack of flexibility both with respect to "smaller" items and with respect to appreciation, and adopting new technology and procedures was often cited. On the other hand, the team noted a capacity among senior drilling personnel to take advantage of the naivete of inexperienced inspectors, and a feeling such inspectors could easily be "snowed". It should be noted that these remarks apply to all inexperienced drilling

inspectors, not COGLA's inspectors in particular. Again, the problem of attracting experienced industry personnel into inspection positions is a significant one in view of the generally higher levels of remuneration available in industry.

4.2 THE CANADIAN COAST GUARD (CCG)

4.2.1 Senior Management

The Management Group in Ottawa is composed of the Commissioner, various Directors-General and the Regional Directors. The descriptions of the most relevant positions are given below with respect to their technical and management functions.

POSITIONS AND RESPONSIBILITIES

The Commissioner is the head of the CCG. He has the authority to make all ongoing operational decisions and is responsible for the implementation of the Canada Shipping Act, in the case of Canadian flag rigs and vessels. Under the Memorandum of Understanding with COGLA, he has the formal responsibility for control and approval of design and construction of drilling units and support vessels and the operation, equipping and marine staffing of such vessels in the case of foreign flag. Relevant personnel reporting directly to the Commissioner include the Director General for Ship Safety and the Regional Directors for the Maritimes and Newfoundland.

The Director General, Ship Safety is accountable for the formulation and implementation of legislation and regulations, and safety standards for the design, construction, operation and maintenance of mobile offshore drilling units and ships, including their machinery and equipment, navigation, handling and stowage of cargo. He is also responsible for the qualification, certification and training of ship personnel and for the maintenance of a Register of Canadian ships and the prevention of pollution by ships. He contributes to the formulation and development of Coast Guard policies, objectives and priorities; makes significant recommendations in areas that impact on the safety of Marine Transportation; and ensures that Canada's international obligations re marine safety matters are met.

The Regional Directors of the Canadian Coast Guard's two regional operations in the Maritimes and in Newfoundland are responsible for overseeing all CCG operations in their regions. Management of CCG's inspection of marine aspects of offshore drilling activity by virtue of the Canada Shipping Act or under COGLA aegis are part of this responsibility.

DISCUSSION OF SKILLS

The senior management of the CCG have a short history of dealing with the offshore petroleum industry with respect to exploratory drilling activities. This lack of experience could potentially play an adverse role in the setting of policy, interaction with the political level, interaction with COGLA and interaction with the industry itself. The ability to distinguish between the marine industry and the

offshore petroleum industry is essential in identifying special concerns relating uniquely to offshore safety in exploratory drilling. In general, senior management strongly influence the direction of the whole organization and the attitudes of its personnel and their knowledge and understanding of the issues dictate the tenor of the organization's response.

The CCG personnel have a difficult problem in that not only are they faced with all the varieties of drilling units and the changes in technology and procedures, but also, they have to regulate the marine industry which is a more traditional industry. Consequently, they must resolve fundamental differences between regulating an innovative offshore petroleum industry on the one hand and a conservative marine industry on the other. In fact, special skills are brought to bear on this problem within the CCG's senior management and considerable progress is being made in assimilating the offshore industry regulation into the existing system.

As with COGLA, the managerial and administrative skills within the CCG are excellent. A good illustration of these is the recognition of the need for special consideration of the offshore petroleum industry resulting in the organization of a dedicated offshore group.

The CCG is placed in a rather difficult situation in that its authority over foreign flag drilling units comes through the Memorandum of Understanding with COGLA. Under the MOU, COGLA, has the final authority. This puts special pressure on the CCG in that, to some extent, they have to

regulate "indirectly". Consequently, the senior management have to utilize considerable skills in maintaining a co-operative and effective relationship with COGLA's senior management. Indications are that, at this level, personnel are able to deal reasonably well with the situation. The only problem perceived by the study team is the difficulty some personnel have in appreciating the regulatory flexibility required.

The CCG's senior management have established effective mechanisms for the development of regulations including the input of industry. In conjunction with COGLA, they appear to be effective in communicating with the industry with respect to safety concerns.

4.2.2 Middle Management

The most relevant positions in Middle Management are discussed below.

POSITIONS AND RESPONSIBILITIES

The Chief, Design and Construction is accountable for all ship design functions and their related safety systems pertaining to safety of life and property at sea by controlling and approving, under the authority of the Canada Shipping Act, the designs and safety systems of all commercial ships, Arctic class vessels and floating drilling structures such as mobile offshore drilling units. He is accountable as Deputy Chairman of the Board of Steamship Inspection for Board rulings made under Section 370 of the Canada Shipping Act and accountable under the CCG/COGLA

Memorandum of Understanding for the safety of all foreign registered drilling units and their support craft operating under COGLA licence. He is also accountable for the development of appropriate safety standards by keeping abreast of advance design technology, and for Research and Development Programs relating to ship and drilling structure design functions.

The Chief, Ship Operations, is accountable for the planning, development, implementation, management and control of national safety standards and regulations for the navigation, routing and traffic separation of ships; radio and navigation installations; loading, handling and stowage of dangerous, hazardous and other special cargoes; manning of ships; emergency procedures for ships and offshore drilling units; cargo handling and mooring equipment; health, safety and working practices of persons employed on ships; firefighting equipment; life-saving appliances and survival systems for ships and offshore drilling units; the registration of ships; the licensing of small craft and assessment of ships tonnage in compliance with the Canada Shipping Act and International Conventions and Agreements. He is a Senior Member of the Board of Steamship Inspection which gives decisions in respect of exemptions and equivalences issued to ships when full compliance with regulations is not possible or practical or when unusual features are presented.

The Chief, Training and Certification is accountable for the training and certification of ship personnel and the central registry of seamen.

The Chief, Planning and Special Projects is accountable for the development of Ship Safety Regulations, Research and Development and Pollution Prevention.

The Regional Manager, Ship Safety for each region is responsible for a staff of surveyors and inspectors whose job is to ensure compliance with CCG requirements for construction, equipping, manning and operation of all vessels within their jurisdiction. The Regional Manager is responsible for planning, coordinating and directing the activities of field offices with reference to the safe working conditions of employees in the Marine Industry and the safe passage of people in marine transportation. He has delegated authority to administer some provisions of the Canada Shipping Act and must ensure that owners, charterers and operators of ships comply with this law. He is responsible for issuance of inspection certificates and is periodically required to take action forcing companies to comply fully.

The Regional Manager develops plans and priorities to ensure the national standard for safety and environment protection in marine transportation is applied, while remaining cognizant of operating requirements and cost-effectiveness in relation to socio-economic impact. This function will be increasingly important as local construction and operation of oil drilling rigs and offshore supply vessels inevitably expand.

DISCUSSION OF SKILLS

As in COGLA, it is the Middle Management level within

Coast Guard which contains the technical personnel who are responsible for managing the hands-on regulatory work and for the formulation and development of regulations. Although these CCG personnel have a wealth of experience in administration of marine transportation and a high degree of expertise in this area, they now must understand the marine technology of the offshore petroleum industry and how it relates to drilling activities. The problems that face Senior Management in understanding the offshore petroleum industry in general, also confront Middle Management, but in a much more detailed way. The latter group must be intimately involved in the design, construction and operation of floating drilling units to the extent that they can perform their own duties and can advise Senior Management on technical matters and supervise the Inspection Group.

At the time this study was being conducted, the study team perceived that the Middle Management level of CCG had an insufficient level of expertise in offshore petroleum technology, both in terms of numbers of personnel and in the depth of experience of offshore drilling. However, there were indications of on-going efforts to remedy any deficiencies, both in terms of plans for increased numbers of staff and in the creation of a new section with specific responsibility in this area.

In addition mechanisms were being put in place for improving co-operation with, and benefiting from the resources of COGLA, other government departments, the petroleum industry and the international regulatory community through the IMO. A specific example of such co-operation was the joint development with COGLA personnel of a new set of

standards covering the design and construction of mobile ocean drilling units for use in Canadian waters.

4.2.3 Inspection Group - CCG

Most inspections by CCG under the Canada Shipping Act and under authority from COGLA are conducted by marine surveyors. The categories of surveyors employed, and their areas of responsibility are given below.

POSITIONS AND RESPONSIBILITIES

The Senior Surveyor directs and supervises the work of marine surveyors and support staff, conducts investigations, examines candidates for marine certificates and provides technical advice to government, the public and industry on marine safety issues. Assisting the senior surveyor in performing these tasks are a selection of in-line surveyors including:

The Marine Surveyor - Hull inspects ships under construction and thereafter inspects modifications, overhauls and repairs of hulls and superstructures. He also inspects lifesaving and fire-fighting equipment and approves design calculations and plans of ship's hull and certain equipment.

The Marine Surveyor - Machinery performs similar inspections of major machinery and equipment on vessels, including inspections of modifications, overhauls and repairs to such equipment.

The Marine Surveyor - Nautical supervises the engagement and discharge of crews, examines voyage records concerning crews and operations, investigates infractions of regulations respecting the operation of ships, arbitrates disputes between masters and crews, investigates marine accidents and shipping casualties, conducts public examinations for nautical certificates of competency and inspects ships' tackle and safety equipment.

The Marine Surveyor - Electrical inspects ship's electrical equipment during manufacture; inspects ships under construction and thereafter as periodically required with respect to modifications, overhauls and repairs of electrical systems and examines design calculations and plans of ships' electrical systems.

These surveyors also perform the above tasks for Canadian flag drilling units and are responsible for inspections to ensure compliance with the new MODU standards.

DISCUSSION OF SKILLS

Coast Guard surveyors generally had more experience at their professions than was the case with drilling inspectors. There appears to be greater continuity in job function among these personnel; this is undoubtedly due to the fact that these disciplines have been well-established and defined, in Canada and world-wide, for a very long time. Formal academic qualifications for these positions are less important than length of experience. On the other hand, there was little experience among surveyors with mobile ocean drilling units, particularly semi submersible units.

The "traditional" nature of job functions involved in marine inspections tends to produce an inflexibility of attitude which is at odds with the dynamic and fast-paced nature of petroleum industry technology. Coast Guard seems to be making efforts to keep pace with this. For example, new categories of surveyors with responsibilities for offshore drilling structures and operations are being created. Academic requirements for such positions are being "beefed-up" to include undergraduate qualifications in naval architecture and structural design.

Another potential problem noted at this level is the lack of a well-developed degree of co-ordination between COGLA and CCG inspection activities; in both timing of inspections and scope of activities. There was evident need for more formal arrangements for co-ordination of inspections to avoid areas of duplication or overlap and to better utilize the skills available in both agencies.

4.3 THE NEWFOUNDLAND AND LABRADOR PETROLEUM DIRECTORATE (NLPD)

4.3.1 Senior Management

The Newfoundland and Labrador Petroleum Directorate is headed by an Executive Director. He has authority for ongoing operational decisions. He bears principal responsibility for implementation of The Petroleum and Natural Gas Act. The Executive Director reports to the Minister responsible for the Petroleum Directorate and receives

direction from him on how to relate NLPD operations to overall government policy. The key senior management position with responsibilities for safety is the Assistant Deputy Minister, Resource Management.

The ADM, Resource Management is responsible for safety-related issues. He is responsible for the administration and enforcement of regulations covering the safety of exploratory drilling. He supervises the Operations Group which together with allied groups is directly involved in the regulation of operation safety.

DISCUSSION OF SKILLS

Many of the observations which were made above concerning Senior Management of COGLA also apply to senior management of NLPD. Specifically the lack of petroleum industry experience versus considerable managerial experience within government is once again evident. As pointed out above, this may not be a problem if senior management can use their management experience to draw on more technically trained experienced subordinates. In particular the engineering backgrounds of both senior managers should facilitate their acquisition and understanding of new technology.

The extensive experience of both senior managers within government facilitates the establishment of good co-operation with other provincial government agencies, in particular the Department of Labour and Manpower, and with the policy making level of government. In addition the ADM - Resource Management has considerable experience in dealing with the petroleum industry from within government.

4.3.2 Middle Management

The principal positions at the Middle Management level within the NLPD having direct responsibility for offshore safety are described below.

The Chief Offshore Operations Inspector supervises offshore operations inspectors and co-ordinates inspection activities with other provincial and federal government departments. His work includes developing and implementing drilling regulations and guidelines. He engages consultants and liases with engineering firms to assist in operations control.

The Drilling Engineer is mandated to develop and implement regulations respecting the safe conduct of exploratory and development drilling operations. This involves the review of oil spill contingency plans and drilling programs, and the monitoring of offshore operations. This position is currently vacant.

The Marine Safety Consultant advises on the safety and operating limits of offshore operations and in the formulation of safety regulations. He liases with education and training committees and other departments of government.

The Ocean Engineer (Environmental Assessment Group) has two main areas of responsibility. One is to evaluate engineering aspects of offshore operations, the other is to manage environmental and safety matters. His work involves the review of drilling programs, contingency plans and environmental assessments.

The Senior Structural Engineer is primarily responsible for the development and implementation of the Design, Construction and Survey Regulations. He is responsible for the issuance of the Certificate of Fitness for drilling units. He monitors the activities of the NLPD's Certifying Authorities and he is the principal technical person who resolves differences of interpretation of regulation between the Certifying Authorities and the industry. He has primary responsibility for formulation and development of regulations and guidelines covering design and construction of drilling units.

DISCUSSION OF SKILLS

The level of technical skill at the middle management level of NLPD, in terms of educational training and experience in the area of responsibility was generally high, with most incumbents holding at least undergraduate and often graduate degrees in their area of expertise. In terms of direct petroleum industry experience, the group was in general weaker, although certain individuals had extensive offshore experience. In particular, the long term vacancy in the position of drilling engineer was considered a significant gap in the coverage of drilling aspects at this level. The study team was informed that NLPD uses an outside consultant with expertise in offshore drilling to partially fill this gap.

With respect to the coverage of marine aspects, it is noted that the Newfoundland regulatory system makes use of classification society representatives to supervise and conduct inspections to specified standards. The evaluation

of the skills level of these agencies was considered outside the scope of this study. However, the international stature and acceptability to industry of these organizations indicates a high level of skills present.

The use of certifying authorities as formalized in the province's "Certificate of Fitness", scheme, appears to be a good solution to the problem of monitoring these items with the limited manpower and resources available to NLPD. However, the scheme requires substantial resources at the middle management level in the form of skilled manpower to develop and update government guidelines on these matters and to monitor the performance of the certifying authorities in surveying to these standards. NLPD resources in this regard appear inadequate especially in terms of numbers of personnel. However, the use of an international advisory committee in the development of these guidelines should bring particularly high levels of expertise to bear on the problems.

4.3.3 Inspectors

POSITIONS AND RESPONSIBILITIES

The provincial regulatory scheme makes use of two types of inspectors.

Drilling inspectors must ensure that all drilling operations are conducted pursuant to provincial drilling regulations. The principal activities of drilling inspectors are:

- assisting in review of applications for Drilling Program Approval;

- monitoring operator's reports;
- handling on-site inspection or investigation of operations;

The NLPD inspection staff consists of four offshore operations inspectors and one chief offshore operations inspector.

Occupational health and safety inspectors inspect offshore work sites to ensure compliance with provincial safety laws including those sections of provincial drilling regulations proclaimed under the Occupational Health and Safety Act. Two such inspectors are employed.

The staff of five drilling and two occupational health and safety inspectors is strong in terms of number and training and some inspectors have very considerable experience. All inspectors are required to complete basic offshore safety training and courses in well-control and BOP training.

All drilling inspectors hold undergraduate degrees in relevant disciplines and all have one to three years experience in the petroleum industry and from one to two years experience in government regulation. Areas of specialized training and experience within the group includes mud and well logging in offshore operations, overpressure training, pipeline systems and subsea systems design.

The occupational health and safety inspectors, appears to have considerable marine and offshore petroleum industry experience (six to twenty years) in various positions such as roughneck, crane operator and materialsman.

The division of inspection responsibilities for the drilling regulations appears to make considerable sense in view of the broad range of subject areas covered by these regulations. The use of two inspectors rather than one should allow a more detailed evaluation of the status of safety matters onboard drilling units, however, it presents a potential problem with respect to co-ordination of inspections and management within government. This situation appears to be well handled, with NLPD providing overall co-ordination of activities.

4.4 NOVA SCOTIA DEPARTMENT OF MINES AND ENERGY

Since all responsibility for management, including monitoring and inspection activity, of the offshore petroleum resource is vested with COGLA, the role of Nova Scotia Provincial officials (principally the Petroleum Resource Section of the Department of Mines and Energy) is limited to that of observer. Thus, in a sense, the provincial representatives serve more as a watchdog of COGLA activity than of the offshore operators themselves.

4.4.1 Senior Management

POSITIONS AND RESPONSIBILITIES

The senior official within the Department responsible for safety offshore is the Assistant Deputy Minister (Energy) who acts as chief advisor to the provincial Minister/Cabinet on offshore issues including the safety of operations and has overall responsibility for administration of the province's involvement in monitoring offshore activity.

DISCUSSION OF SKILLS

The Nova Scotia government has set up an Offshore Co-ordinating Committee (O.C.C.) with representatives from Provincial Departments of Fisheries, Development, Environment, Finance, Labour and Manpower and Mines and Energy. The O.C.C. reports directly to the Provincial Cabinet on all offshore issues. The Assistant Deputy Minister, Energy is a member of the O.C.C.; he is also one of the two Nova Scotia members on the five person Canada-Nova Scotia Offshore Oil and Gas Board and thus is a most central and pivotal figure in the Nova Scotia Offshore Administrative set-up.

The incumbent appears qualified in terms of training and experience for this position. The skills necessary for this job are largely those of effective communication and liaison with federal agencies, principally COGLA, which have direct responsibility for offshore safety. He has extensive experience in dealing with intergovernmental and interagency committees.

4.4.2 Middle Management

POSITIONS AND RESPONSIBILITIES

The Manager, Petroleum Resources has technical responsibility for liaison with the COGLA Nova Scotia office on matters related to offshore operations including safety issues. He is involved in an advisory capacity in the assessment of applications for Drilling Program Approval and for Authority to Drill a Well.

DISCUSSION OF SKILLS

The incumbent is a petroleum engineer with experience in industry as well as within government. He appears to be sufficiently qualified to effectively monitor and oversee the technical aspects of offshore operations.

4.4.3 Inspectors

POSITIONS AND RESPONSIBILITIES

Petroleum Inspector - The responsibilities of this position include accompanying federal inspectors and classification society personnel on periodic inspections of drilling units and rescue/stand-by vessels and conducting independent pre-sailing and post-sailing inspections of drilling units.

DISCUSSION OF SKILLS

The incumbent inspector appears qualified and has considerable previous experience within the federal regulatory system. He appears to skillfully perform his principal task of watch dog over COGLA's inspection activities.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUDING REMARKS

There can be no doubt about the importance of staffing regulatory agencies with highly and appropriately qualified personnel. This criterion is particularly vital in agencies responsible for regulating offshore petroleum development, as the safety hazards resulting from inadequacy or inconsistency in regulations or their enforcement could be enormously significant.

Mitigating against the ability of these regulatory agencies to build strong, highly skilled teams are such factors as the ever-changing technology involved which requires a constant up-dating of technical knowledge and the competition for good people arising from within industry itself. The situation in eastern Canada is exacerbated by pressures on the agencies to pursue an aggressive development strategy and to absorb the series of organizational modifications that are inevitable in a new, high-growth enterprise, while maintaining high standards of regulatory activity. These added factors make the actual job (and hence the skills required to perform it competently) increasingly complex and demanding.

The study team recognizes these pressures and feels that the regulatory agencies under consideration have coped well with the task of upgrading the skills and general competence of their units. This report also recognizes the practical difficulties inherent in the basic tenet which underlies most of our recommendations - the need for more industry experience on regulatory staffs, particularly at senior levels.

One possible suggestion for securing industry input without incurring the prohibitive costs of full-time senior personnel might be the use of retired industry executives who could provide valuable skills and knowledge to the regulatory staff on a part-time or consultant basis.

5.2 RECOMMENDATIONS

1. That COGLA recognize the importance of offshore petroleum industry knowledge as a prerequisite for decision making at the Senior Management level, that they encourage senior management personnel to augment the existing quota of expertise with input from technically knowledgeable peers and subordinates, and that they encourage senior personnel to increase their own exposure in this area whenever possible, particularly with regard to new petroleum-related technologies.

2. That COGLA encourage senior management personnel to continue to actively seek input from industry in the development of regulations, guidelines, and training requirements.

3. That COGLA place greater emphasis on industry-related and technical expertise when choosing and training personnel for inspections positions.

4. That CCG encourage its Senior Management to recognize the difficulties inherent in the transfer of operations from a marine focus to a combined marine and petroleum - development focus, and that they continue to strive for a balance between the requirements of the two

sectors by increasing their expertise in the new area and promoting co-operation among the various factions involved.

5. That the CCG recognize the importance of up-to-date technical expertise on the part of Middle Management personnel, and that the agency actively encourage these personnel to augment their own level of technical knowledge and to draw on the practical experiences of their subordinates in the Inspections Group where necessary.

6. That both COGLA and CCG recognize a real, or at least perceived, potential for conflict and rivalry on the part of their respective agencies in areas where their jurisdiction overlaps, as for example in the case of the MOU on foreign flag drilling units, and that these endeavour to minimize this potential conflict and to encourage full and productive co-operation on issues of mutual concern.

7. That NLPD recognize the importance of some form of petroleum industry experience or apprenticeship as a supplement to government or managerial expertise in decision-making at senior levels, and that they continue their efforts to provide this mix within their ranks.

8. That NLPD recognize the key importance of the more technically oriented positions among senior staff, and ensure that these positions are not allowed to remain vacant for significant periods of time.

APPENDIX A

TERMS OF REFERENCE

TERMS OF REFERENCE

STUDY OBJECTIVE

To assess critically the skills required by and the skills present in regulatory groups in relation to the safety of Eastern Canada offshore exploration drilling.

STUDY SCOPE

This study will be concerned with the skills required and the skills present in personnel who have responsibility for the formulation, monitoring, and enforcement of regulations and directives in relation to the safety of personnel engaged in Eastern Canada offshore exploratory drilling.

The study will encompass both marine and industrial safety and will be concerned with regulatory groups whose performance impacts upon operational procedures, equipment, and other safety-related matters.

Definitions

Marine Safety - will encompass those aspects of safety which pertain to the preservation of life and the prevention of marine-related, life-threatening incidents in a marine environment. As such, marine safety will include, but will not be limited to, evacuation equipment and procedures, survival equipment and procedures, and marine-related operational equipment and procedures on MODU's.

Industrial Safety - for the purposes of this study, will encompass those aspects of safety directly related to the safety of all personnel on a drilling unit. As such, items such as firefighting and well-control equipment and procedures which affect personnel will be included; but items such as safety clothing and electrical equipment which would not affect the safety of all personnel would be excluded.

TASK DESCRIPTION

1. The contractor will identify the groups within the Federal and Provincial regulatory structures which have direct responsibility for the various facets of industrial and marine safety. These responsibilities will include the responsibilities for the formulation, monitoring, granting of exceptions to, and enforcement of regulations and directives, as well as the responsibility for safety-related inspections of equipment and procedures.

2. The specific skills necessary to formulate, monitor, enforce, and grant exceptions to regulations and directives will be determined for each facet of industrial and marine safety. These skills may include but are not limited to:

- A working knowledge of various pieces of equipment.
- Special formal training.
- Hands-on experience.

3. In addition to the specialist skills necessary for each facet of industrial and marine safety, the contractor will prepare a general description of the capabilities required by the various levels in the regulatory administration regardless of the technical area of responsibility.

4. The skills possessed by each of the groups responsible for the various facets of marine and industrial safety will be identified and evaluated relative to the specific skills necessary to effectively formulate, monitor, enforce, and grant exceptions to regulations and directives in that area. Particular attention will be paid to personnel involved in the inspection of equipment and procedures with the intent of granting approvals or enforcing of regulations.

5. The capabilities of the personnel in the various levels in the regulatory administration will be identified and evaluated relative to the required capabilities which were developed in task #3.

6. Conclusions will be drawn as to the levels of skills and capabilities present in the various regulatory groups and as to how the present levels of skills could adversely affect the safety of Eastern Canada offshore exploratory drilling.

